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ABSTRACT

Reported are findings of a project examining the scholastic levels of attainment, social relationships, and interests of 73 primary level students with IQs ranging from 141 to 213 on the Stanford-Binet Intelligence Scale. Initial chapters (which differentiate this document from a similar report--ED 133 939) cover the relevance of children of exceptional intelligence to modern industrial society, the childhood of eminent British people and the historical development of educational provisions for the intellectually able in Britain, modern psychological models of the intellect and the implications of such for learning by highly able students, and a literature review on gifted children (with emphasis on studies by Terman, Burt, Hitchfield, Ogilvie, and the proceedings of the First World Conference on Gifted Children.) It is noted that students were given National Foundation of Educational Research tests, and questionnaires were completed by parents, teachers, and students. Among findings reported are that the mean educational quotients and achievement indexes for English and mathematics were significantly lower for the highly able, relative to their ability, for three out of four comparisons made; that questionnaires showed the highly able to have a greater liking for reading, creative writing, and mathematics than the control group; that parents of the majority of the sample assisted their children's school learning; and that teachers rated the highly able to have a lower standard of attainment at games and swimming than the control group and to be less popular than the peer group. Appended are tables with statistical data. (Author/SBH)

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THESIS

ON

A COMPARISON OF ACHIEVEMENT AND ABILITY IN CHILDREN OF HIGH INTELLECTUAL POTENTIAL

SUBMITTED FOR A DEGREE OF

M. Phil.

BY

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ABSTRACT

The relevance of children of exceptional intelligence to modern industrial society is studied. The childhood of eminent British people and the historical development of educational provisions for the intellectually able in Britain are considered. Modern psychological models of the intellect and the implications of such for learning by Highly-Able pupils is examined. The American and British literature on gifted children is reviewed, emphasis being given to the studies made by Terman, Burt, Hitchfield, Ogilvie and the proceedings of the First World Conference on Gifted Children (1975).

This project has examined the scholastic levels of attainment, social relationships and interests of 73 pupils with IQs ranging from 141 to 213 on the Stanford-Binet Intelligence Scale, drawn from 31 primary schools with a roll of 9,200 pupils. 64 Control pupils drawn from the same school classes were paired with the Highly-Able group for sex, socio-economic background and age. The pupils worked N.F.E.R. attainment tests and questionnaires were completed by the parents, teachers and pupils themselves.

The mean Educational Quotients and Achievement Indices for English and Mathematics were significantly lower for the Highly-Able, relative to their ability, for three out of four comparisons made.

The questionnaires showed the Highly-Able to have a greater liking for Reading, Creative Writing and Mathematics than the Control group. The parents of the majority of the sample assisted their off-spring's school learning. The teachers rated the Highly-Able to have a lower standard of attainment at Games and Swimming than the Control group and to be less popular with the peer group.

The teachers failed to identify 16% of the Highly-Able and under-estimated the standard of work of which the pupils were capable of 62% of this Group.

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Chapter 1

INTRODUCTION

Current Educational Thought

Levels of scholastic attainment reached by children continue to be a matter of concern in educational research (Entwistle, 1973), to the public as represented by employers (e.g. T.E.S. 23.1.76) and to the political parties (e.g. T.E.S. 28.5.76). As Husén (1972) has pointed out, science and technology have released forces which are of such staggering power that human-beings must benefit from a better education than in the past if they are to harness these forces to the well-being of their countries. The relevance of 'intelligence' to levels of performance is generally accepted and it is referred to as 'still the single most effective predictor of school achievement' by Entwistle (op.cit.p.89.)

In the United States the current discussion reflects continued debate regarding the relationships between intelligence and scholastic attainment. This finds expression in considerations of the relative importance of the genetic and environmental influences on intelligence, a question which has been examined in depth by Jensen in his paper, 'How Much Can We Boost I.Q. and Scholastic Achievement?' (1969). Widespread discussion was generated by Jensen's treatment of this issue which included a challenge regarding the interpretation of his data by Kagan (op.cit.p.126).

By contrast, British researchers have been more concerned with the social and educational determinants of scholastic attainment, perhaps reflecting an aversion to psychometric comparisons following upon the discrediting of the eleven-plus selection procedures for secondary education. Accordingly, emphasis has been concerned with pre-school development of socially deprived sections of the community and immigrant infants, such as that undertaken by Tizard (1972, 1974), investigations into the effects of familial influences on language development and scholastic learning (Newson, Newson and Barnes, 1973, p. 58) and studies regarding the results of physical and social handicaps in educational pursuits as in the researches made under the auspices of the National Children's Bureau. Nevertheless, a major study, involving a large sample of the whole school population in the nine to fourteen years age range, has been made into standards of attainment in reading skills related to pupils' I.Qs. (Yale et al. 1974).

Where levels of attainment have been questioned the causes of unfulfilment of promise have generally been sought in the children's background conditions - that is, in what the pupils have brought with them into school rather than in the school's efficiency in promoting learning, given the potential for such learning found among the intake of children. Recently a study has been made of the levels of skill in the 'Three R's' displayed by children in primary schools according to whether classroom organisation has been of the traditional or progressive form (Bennett, 1976). However, to date no study has been made of the learning efficiency ratio among pupils who have suffered no marked cultural or social deprivation and who score exceptionally high Intelligence Quotients. This may perhaps be accounted for by an assumption that where children obtain a level of performance at, or above, that attained by the majority of their age-group, the educational outcome is satisfactory so that no further demands need be made upon scholastic institutions, certainly not by the intellectually highly-able child who already has a 'bonus' vis-à-vis other children in that he/she can learn with little effort. The specific concern here with high levels of attainment by pupils able to score within the top 2% of the intelligence scale is not to deny the great importance of pre-school learning and social environment for school success. The relationship of scholastic performance to measured potential is given separate consideration in order to tease out another factor affecting possible outcomes of the learning process. An examination of the utilisation of superior mental ability is believed to be important irrespectively of how such potential may have been acquired.

Thus, the present study sets out to examine the efficiency ratio of ability input to learning output among a sample of primary school children where physical deprivation has been absent and among whom the cultural and familial environment has been, in general, favourably orientated towards the children's school learning. The investigation is into the levels of attainment and social adjustment in school of 137 pupils drawn from middle-class and embourgeoised working-class homes in a period of material affluence. The sample is divided into two groups according to the extent of their measured intellectual ability. The study is concerned to examine a) whether there is a waste of learning time in the group with the very high IQ's in comparison with a second group scoring more moderately on the same intelligence scale and, b) whether the scholastic environment may be prejudicial to the optimum development of the very highly intellectual children.

'Intellectual Ability'

Before proceeding further the interpretation of the term 'Intellectual Ability' to be used in this study must be considered.

Eysenck (1973, p. 2) likens intelligence to gravitation as both are but concepts in the minds of scientists although in neither case does this preclude their measurement. He continues, "Intelligence, as the psychologist perceives it, is a hypothetical entity, a force, which is posited in order to explain certain types of behaviour." In the present thesis, 'high intellectual ability', and synonyms used for this term, will be taken to mean a powerful psychological force as elucidated by Eysenck.

The term 'intellectual ability' is taken as referring primarily to Spearman's 'g', general ability, but only according to the tests used here. No attempt is made to disentangle the 'fluid' and 'crystallised' components of 'g' distinguished by Cattell (1963). However, since the present study is directed towards the extent to which potential for conceptual learning and problem-solving has been realised, its concern is rather more with 'fluid' intelligence as compared with the 'crystalline' outcome. It is recognised, of course, that the latter does, and must, enter into the levels of educational attainments found among the sample.

The adjective, 'intellectual' as used here, may be taken as derived from the noun 'intelligence', where the latter has the specific meaning assigned to it by Jensen (1972, p. 88) as, "the general factor common to standard tests of intelligence". It is, again in Jensen's words (op.cit. p. 88) "probably best thought of as a capacity for abstract reasoning and problem-solving". The term 'intellectual ability' is not being used to refer to the totality of an individual's mental capabilities.

In the present study an operational approach is being taken as regards the nature of intelligence. Certain types of performances by numbers of individuals on particular selected and graded tasks have been found to correlate highly with each other and with school success in general, (Vernon, 1955, p. 153). This being the case, intelligence as defined in this thesis, following ensen (1972, p. 74 & p. 76) can be measured.

The foregoing is not to say that what is measured is innate intelligence in a pure form. Eysenck (1973, p. 479) referring to the model of intelligence which is presented by modern psychology says, "The essential features of this paradigm are that intelligence can be conceived as "innate, general, cognitive ability;" (op.cit. p. 486), and continues, "Measurement of this hypothetical quality, intelligence, can be undertaken with a certain degree of accuracy; such measurement is both reliable and valid." However, an important further distinction which has been made by Hebb (ed. Wiseman, 1968, p. 251) is relevant to the present work. The latter theorist has distinguished as 'Intelligence A' the individual's inherited genetically determined hypothesised potential for intellectual growth. The product of the genetype and the individual's environment, education, personality, etc. is reflected in performance and has been designated 'Intelligence B'. Vernon has commented regarding the latter, "When people are brought up in reasonably standard environment the correlations between measures of intelligence given some months, or even years apart, are in fact remarkably high" (Vernon, 1969, p. 10). He continues, saying that 'IntelligenceB' "Should be regarded as a name for all the various cognitive skills which are developed in, and valued by, the group." He goes on, "In Western civilisation it refers mainly to grasping relations and symbolic thinking, and this permeates to some extent all the abilities we show at school, at work, or in daily life..."

It being accepted in theory that 'Intelligence' may be measured, the problem still remains of developing instruments for this purpose. It cannot be expected that tests can, or will be, produced which measure 'Intelligence B' perfectly since their construction involves selection of test material and such instruments can only sample that which the test constructor has considered to be intelligent behaviour. Accordingly, Vernon (1955) has denoted as 'Intelligence C', intelligent behaviour as sampled by intelligence tests. It is this latter abstraction which is referred to in the phrase, 'intellectual ability' used in the present study.

Relevance of Intellectual Ability to Industrial Society

Eysenck (1973, p.X) recalls that elsewhere and in different periods of history societies have been dominated by values other than high intellectual ability and he instances that, "Many societies have glorified the warrior, and have rewarded and valued strength, courage and agility in battle." As regards modern Western society, he expresses the view that like that of the Greek culture before it, it "is orientated towards, and dominated by, intelligence and intellectual achievement; that its success is dependent upon this orientation and this dominance; and that it values and rewards people generally in direct proportion to the extent of their intellectual performance..." The latter claim is supported by a Table 1 of Mean IQs obtained from a summary of information contained in papers published by Burt (1961), Cattell (1934, 1971), Fryer (1922), Harrell and Harrell (1945), and Himmelweit and Whitefield (1949), showing a hierarchical occupational pattern related to falling decades in Mean IQ levels.

Jensen (1973, p. 89) too, sees intelligence as having been "singled out as especially important by the educational and occupational demands previaling in all industrial societies..." He points out that in earlier pre-industrial society when "the entire population's work consisted almost completely of gathering or producing food by primitive means, there was little need for a large number of persons with IQs much above 100" since few of the jobs which had to be done required it. However, he raises the question (op.cit. p. 170) as to whether the collective national (USA) intelligence level is adequate to meet the growing needs of an increasingly complex industrial society.

As regards those persons possessing the type of intelligence which enables them to score highly on intelligence tests, Jensen (1972, p. 88) asserts that what "we can measure by means of 'intelligence' tests, has been singled out from the total galaxy of mental abilities as being especially important in our society mainly because of the nature of our traditional system of formal education and the occupational structure with which it is co-ordinated." He continues, "Thus the predominant importance of intelligence is derived, not from any absolute criteria or God-given desiderata, but from societal demands."

Measured Intellectual Ability Relative to Scholastic Attainment

Vernon (1969, p. 26) expresses the view that a distinction between the individual's attainment on an intelligence test and that achieved in the more specific skills taught in schools is both possible and desirable. He makes the point that the level of achievement reached in respect of the school curriculum "depends greatly both on the effectiveness of instruction and practice, and on the child's interest in the topic, his motivation and his adjustment to school and teacher." He continues commenting that, whereas intelligence refers to more generalised thinking capacities which can be applied in any kind of new learning, these are developed as much by home and out-of-school, as by school, experiences. Later, (p. 27) the argument is repeated and taken further when he says, ".... an intelligence test gives a somewhat better index of potentiality than other measures of achievement to date. But mainly it is useful in predicting educability or trainability because of its greater generality, and because it samples the reasoning capacities developed outside school which the child should be able to apply in school, e.g. to new subjects".

Accordingly, the present pilot study has sought to discover whether among highly intelligent children (as defined above), when due allowance has been made for other influences, errors of measurement and the like, the level of scholastic attainment reached is as high as might be expected given their measured potential. If there appears to be a prima facie case for concluding that the scholastic achievements obtained by such children fall short of that which might have been anticipated, then there would be reasons for concern at such results.

First, there is the social need in an industrial society, as mentioned by Jensen above, for an increasing number of persons qualified in highly specific occupations requiring for their practice a high degree of reasoning ability and problem-solving capabilities. If a sizeable proportion of those who have been predicted by the results of an intelligence test as having exceptionally high educability are falling short of expectations in scholastic attainment to a marked degree, then it would appear that maximum use is not being made of their learning ability and that accordingly a social loss is being incurred.

The Highly-Intellectual Individual and Scholastic Attainment

The possible outcomes for the pupils.themselves is the second area for concern should scholastic levels be falling significantly below that which for highly intelligent children might be anticipated. As Pringle says (1970, p. 107), 'Whatever their level of ability, children need to experience in their learning the stimulus of success as well as the discipline of failure, without being overwhelmed by guilt or anxiety." If a highly intelligent child receives insufficient stimulation in his/her scholastic work, it is likely to be detrimental to the pupil's development. This would, of course, be true of those of more average measured ability too, but from the very fact that such latter children were not exceptionally able, the situation would be less likely to occur. A great deal of educational literature has been devoted to ways and means of raising the scholastic levels of performance by those with normal or sub-normal ability. By way of example, reference may be made to the concept of 'Mastery Learning' (Block, 1972) which technique seems so to programme learning material and obtain feedback for the teacher that nearly all the children in a group succeed in mastering the material to be learnt. This system could equally well be applied to the child of super-normal ability but since little, if any, direct reference is made to such an interpretation of the method, it seems highly probable that teachers will be less aware of pupils able to master a concept in well below the average time than they are of the slow-learning child.

It seems likely that where a boy or girl is under-extended the child is wasting his/her learning time to his/her own disadvantage since, a) such a child will enjoy the fruits an extended knowledge less than to the optimum level for him/her as an individual as his/her appreciation of the 'good' life by "the productive use of leisure" (OECD, 1973, Carr-Hill & Magnussen, p. 92) will be unnecessarily restricted; b) in a meritocratic industrial society he/she may find eventually that entrance to institutions of higher education or of a chosen occupation for which he/she has both a liking and a natural aptitude is nevertheless closed through failure to have gained the necessary paper qualifications and requisite background knowledge. Accordingly, such individuals may not be just precluded from higher earning occupations but fail also to find satisfying work of an intellectual nature.

Classroom under-stimulation of the highly-able pupil may lead to extra-curricula 'learning' of an undesirable type both from the child's own and society's viewpoint. The under-stimulated highly intellectual child, may 'learn' to fit-in to a scholastic environment by making little or no intellectual effort or even by concealing the speed with which he/she is able to learn in order not to antagonise the peer group on the one hand or embarrass the teacher by his/her knowledge on the other.

The detrimental effects, which situations like those outlined above could have upon society through waste of intellectual talent, as well as on the individual children concerned by being contrary to their beneficial development, are the reasons why the present study has been undertaken.

Chapter 2

EDUCATIONAL PROVISIONS AND THE HIGHLY-ABLE CHILD

EDUCATIONAL AIMS

Most educationalists in Britain today are of the opinion that the educational system should number among its aims the optimum development of the latent abilities of all children so that as adults they may fulfil themselves and make a full contribution to the society of which they are a part. There are, however, differences of opinion as to which criteria should represent the successful outcome of the educational process, and as regards the practical manner in which the desired results might be brought about and the degree of their attainment evaluated. The view that all children should have equal educational opportunity is widely held as is the view that selection methods for different curriculums have been biased in favour of particular sections of the community thus denying comparable openings to the under-privileged. Children may be handicapped by the accident of their birth either physically, mentally or on account of their environmental conditions, and "the notion of 'compensatory education' has been introduced as a means of changing the status of the children in these categories." (Berstein, New Society, 26.2.1970, p. 344). Those supporting the pre-school programmes like "Project Headstart" in the United States (Adam, New Society, 30.10.1969) have favoured directing additional resources to infants suffering deprivation so that their handicap might be lessened to the extent that formal education at the normal age of starting school may be undertaken on a more equal footing with their more fortunate peers.

Another view put forward is that the intellectually able and otherwise talented children should have their aptitudes developed to the full not only for their own fulfilment but also so that they can make a major contribution to the community at large and be the means whereby a higher standard of life and improved amenities may be enjoyed by all, including their less-able peers (Burt, Yr.Bk.Ed., 1962).

HISTORICAL BACKGROUND

Early Educational Opportunities

Some opportunities for the development of intellectual talent have always existed but methods of identifying exceptional ability and of facilitating its nurture have changed during the course of the growth of educational institutions since the sixteenth and seventeenth centuries. Throughout the period occasions have been availabel for the development of the cognitive skills, particularly of the upper sections of society, but avenues of advancement have also existed for other sections of the population. The aristocracy provided for the education of their children mainly from a study of books concerned both with past happenings and those contemporary to their times. Private tutors schooled the young of a social elite primarily through the written word and verbal discussions upon it, supplemented by direct learning from the immediate natural environment and, more rarely, from visits to places of note and to foreign countries. Provision was made for learning by the children of those in the professions, of farmers and of traders, by home tuition by one of the parents and/or by the parents paying for their off-spring's attendance at the house of a local teacher and through sending them to school when they were older. Instructions might also be given by the vicar.

Reference is made here to past educational experience with the development of outstandingly talented individuals since this adds some light on the present day task of providing educational facilities for highly intelligent children. Two excerpts from educational history will receive brief discussion: firstly, consideration of the childhood background of a few of the outstanding British contributors to man's cultural or scientific heritage; secondly, some points along the path of administrative provisions for the schooling of academically exceptional children.

Eminent Individuals in the Past

The lives of over three hundred of the world's most eminent men and women who lived between 1450 - 1850 and who have since been recognised as having made outstanding contributions to art, music, as statesmen, authors and scientists, have been studied (Cox, 1926). The family and educational backgrounds of these individuals have been traced and their intellectual ability as children estimated while a sub-group of one hundred who were outstanding during the late eighteenth and the nineteenth centuries has been given separate attention; their childhood development was influenced, it is reported, (op.cit. p. 165) by home training and discipline, breadth of home interests, the community, current events and education.

The methodology used in Cox's work was suggested by Terman and involved, "a study of the 'brightness' of a historical character by the application to historical data of the criteria of standardised measures of the mental ability of children". (Op.cit. p. 21). Referring to the reliability and validity of historiometric methods, Cox quotes from Wood's findings that, "a workable instrument has been obtained capable not only with dealing with questions as intricate as human nature and its attitudes, but actively at the same time demonstrating the essential validity of the historical data on which are based the percentile grades, ratios, correlations or other superstructure, (Wood, Histriometry as an Exact Science, Science, N.S.33, pp. 568-574).

Cox (1926, p. 47) outlines the methods she used and continues, "Ratings were made on the basis of the standards and norms for intelligent behaviour established by mental tests. These are expressed in terms of the IQ (intelligence quotient), the ratio of mental age to chronological age." Each individual received two IQ ratings: (1) the A.I. IQ, an average of three independent estimates of the individual's intelligence as represented up to the 17th birthday; and (2) the A.II IQ, an average of three independent estimates of the level of intelligence as reported up to the 26th birthday.

The avenues along which intellectual talent was developed within an embryonic British educational system is illustrated by the case histories of such outstanding individuals as Thomas Hobbes, Thomas Wolsey, Charlotte Bronte, and Sir Isaac Newton, to select but a few individuals who are particularly well-known. Of those included in Table 2/1, all received pairs of estimated IQs in the superior adult category with the exception of one rating for Faraday (105) although the second rating was high (150).

For the cases quoted in Table 2/1, superior intelligence may be seen as a common characteristic together with parental concern for their child's development and a strong interest in their off-spring's progress in a period when the demand for educational provisions was limited. However, although the degree of error in such IQ values is likely to be considerable, unless the values grossly understate the ability of the

TABLE 2/1 SOME CHARACTERISTICS OF OUTSTANDING HISTORICAL PERSONALITIES

Name	Dates	Background		Estimated I.Q.	Field of Endeavour
		Family	Early Education		
Thomas Wolsey	1475-1530	Father: a grasier	No early record. Obt. B.A.(Oxon.) at 14 yrs.	165	A Cardinal & Minister of State
Thomas Hobbes	1588-1679	Father: a vicar. Mother of yeoman stock	Aged 4-8 yrs. at Ch. school. Went to Oxford at 14 yrs.	135-40	Philosopher Scholar
Sir Issac Newton	1642-1727	Father: a farmer. Child born posthumously. Mother remarried when aged 3 yrs. - brought up by grandmother	Mother 'Became convinced that her son was not destined to be a tiller of the soil' and 'resolved to give him all the advantages which education could bestow'. Sent to school at usual age.	130-70	Physicist Natural Philosopher Mathematician
James Watt	1736-1819	Father: a builder and merchant	As a little child taught by mother and father. Ill health kept him from regular school.	140-5	Harnessed electricity Civil Engineer
Humphry Davy	1778-1829	Father: a woodcarver of yeoman stock - the family belonged to a class which had had a lettered educ. for generations	At five attended elementary school. Entered grammar school aged seven years.	150-75	Chemist Engineer
Michael Faraday	1791-1867	Father: a journeyman blacksmith family belonged to class of small traders	Sent to a dame school - then to a 'common day school'.	105-50	Physicist
Charles Darwin	1809-1882	Father: a physician. Mother had a liberal educ. and read widely	At eight years sent to day school - to a boarding school at ten years.	135-40	Naturalist
Charlotte Bronte	1816-1855	Father: a clergyman	Taught by father who gave regular lessons. Sent to school for daughters of clergy at eight years.	155	Novelist

individuals concerned, it seems there must have been many more persons among their respective generations of equal potential who did not receive lasting public recognition.

Developments since the 1870 Education Act

The Education Act of 1870 saw the commencement of universal elementary education in this country. The practice developed of giving additional tuition to the brighter children in the early elementary schools and these pupils subsequently assisted as 'monitors' in the large classes. From among such children a number became trained teachers for whom the new Act had increased demand, while others met the demands for trained cognitive skills from industry and commerce in an expanding economy.

The spontaneous development of talents gave way to a systematic search for their identification in the early twentieth century. First, existing fee-paying secondary schools were expanded and then new ones established, while a system of scholarships was introduced so that the brighter children among the economically-poorer classes might be enabled to receive an appropriate education. The pre-1914 period saw the growth of the 'Free Place System' whereby children who were judged likely to benefit from additional education received free admission to secondary schools. Institutions which agreed to reserve at least 25% of their places for such children received a grant in respect of each "special place" child.

London Surveys

It has been estimated (Burt, 1962) that by 1913 nearly 2% of children were awarded scholarships to secondary grammar-type schools. However, the geographical distribution of such scholarship winners was uneven and this position was investigated by Burt (1915) who reported that a number of the brightest children from homes with low economic and cultural standards were being missed since, 'their scholastic attainments fell greatly below their real abilities'.

In 1916 Burt surveyed the educational abilities of the children in all the elementary schools of a single representative borough by means of teachers' ratings and mental and scholastic tests. He found that the rate of scholastic progress for 'defective' children was about half that of the ordinary elementary children (Burt, 1917, L.C.C. 'Distribution and Relations of Educational Abilities). At the same time he concluded that bright children should be advanced above the average of the standard for their year-group by 15% of their chronological age while those securing Junior County Scholarships should be advanced by 25% of their age. He commented that bright, but unselected, children remaining in the elementary schools may not have developed fully - perhaps as there was too much marking time in the top class. He adds that provision was needed for children in the special categories - backward, defective, unstable, advanced and talented. Burt believed that it was what a child could learn rather than what he had learnt which was of importance and he said that the golden maxim should be: 'Promote by attainment rather than by age and by ability rather than by attainment', but that in too many schools the order of precedence was inverted. Accordingly, he believed that the teacher besides examining the child's level of acquired knowledge, should also possess some means of gauging his mental capacity. However, even in this early work (1917) there is already recognition that scholastic aptitudes are complex and among other things may be affected by motivation, culture in the home and the personality of the teacher. Later Burt says, (1921, p. 218) "A child's proficiency in the Binet-Simon test is the complex resultant of a thousand intermingling factors. Besides the two essential items, the intelligence he has inherited and the age he has reached, a host of subsidiary conditions inevitably effect the score. Zeal, industry, goodwill, emotional stability, scholastic information, the accident of social class, the circumstance of sex - each and all of these irrelevant influences, in one case propitious in another prejudicial, improve or impair the final result." Burt continues (p.219) ".... of these numerous intervening agencies, the most potent is, without doubt, educational opportunity. Estimated by the Stanford-Binet scale, therefore, a child's apparent intelligence must depend in no small measure upon his class in school."

Burt reports that he examined 689 children in four schools for both intelligence and attainment marks and that, although the correlation between mental ratio and educational ratio was only .738, yet several inferences could be drawn from the frequency table (ibid. p.220). "First", he says, "the children who are most retarded mentally appear still more retarded educationally," (in italics) and he sums up: "Feeble ability, then entails acquirements feebler still." Second, for those attaining ratios slightly below the average, between 85 - 100, this tendency appears reversed. "There is discernible an effort, and an effort by no means sterile, to coax and coach these milder dullards to a grade more closely fitting to their actual age." (in italics.) Here the average mental ratio was 93.7 while the average educational ratio was 95.8. Third, for the group with an average mental ratio of 106.9 the relationship of the two measures was reversed and the average educational ration as only 102.2. Burt comments in italics again: "These children, then, despite superior talent, are largely kept back scholastically, depressed to a stage which answers more closely to their actual years. Indeed the whole table unmasks a strong disposition to level a child's school-work up or down towards the common standard for his age." Fourth, turning to the brightest children with a mental ratio of 123.1, Burt found their educational ratio to be 111.2 and he comments that, "the same repression is perceptible." Taking the more salient cases of disparity he found that ten children had an educational ratio 30% or more below their mental age while the reverse never occurred. He refers to the cleverest child found, a boy aged 8y. 2m. with a mental age of 12y. 6m. and an I.Q. 154 who was in Standard IV but in tested ability was even with children in Standard VI. He comments, "... yet in a department organised in the usual way, to promote so young a child to so high a class would seem hardly politic. Cases of this order raise a practical issue." He sums up: "In general it is the most gifted of all whose attainments fall most seriously below their real capacities." However, he did find that in most cases the child, "of above average intelligence was also above average in all else - health, height, emotional stability, social adjustment, as well as scholastic achievement."

Burt used (ibid. p. 226) partial correlation analysis to discover whether the child's display of ability is affected by his school attainments. Studying the results for three hundred pupils aged seven to fourteen in this way he found that when the influence of measured intelligence is excluded there remains a correspondence between age and position in the school that was considered to be unwarrantably close - commenting, he says, 'promotion goes suspiciously with seniority.' A separate finding was that when both age and the intelligence score were held constant the partial correlation was such that there could be 'little doubt that with the Binet-Simon scale a child's mental age is a measure not only of the amount of intelligence with which he is congenitally endowed... it is also an index, largely though not perhaps mainly, of the mass of scholastic information and skill which, in virtue of attendance more or less regular, and by dint of instruction more or less effective, he has progressively accumulated in school.' He finds this conclusion supported by a correlation of .49 between age and educational attainment left after the elimination of ability indicates the undue influence of age upon school classification.

The Tri-Partite System

In the post-war years which followed, Burt's work, together with that of other psychologists, was a major influence on contemporary educational thought. An increasing number of scholarship places were made available for those believed to be intellectually able children. By 1938 the Spens Report recommended, 'that provision based on an annual average admission to the Grammar Schools of 15% of the 'secondary school age-group' in the public elementary schools might be taken as a working figure. The War interrupted the implementation of these proposals but in 1943 a White Paper expressed the view that selection of Junior School children should not be on the basis of a competitive test, but on, 'an assessment of their individual aptitudes largely by such means as school records, supplemented, if necessary, by intelligence tests, due regard being had to their parents wishes and the careers they have in mind'. The decision at age eleven was not to be final, facilities being provided for transfer between types of school at thirteen or even later. The keynote was to be that the child should be the centre upon which educational decisions should be based. These recommendations were given force by the provisions of the 1944 Education Act. Intelligence tests were now regularly utilised in the procedure for selecting pupils for the Secondary Grammar Schools, one of the reasons for the inclusion of such tests being that they were thought to be less prejudicial than the standard subject attainment tests, to those children from schools where teaching was of a relatively poorer quality and/or from homes in the less favoured social and economic classes.

Subsequent experience was to show that such intelligence tests were not culture-free, were subject to a margin of statistical error and that they were unreliable as regards predicting later educational success. Even so, as has been found by Vernon, (1969) given similar cultural and socio-economic backgrounds, the intelligence tests are a means of identifying those children more likely to be successful at intellectual work than others. Unfortunately, the original aims, as expressed in the Spens Report (1938), of making the child the centre of the educational system and of three types of educational institutions most suited to the natural talents and aptitudes of the individual children were thwarted by some parents pressing their children to obtain a Secondary Grammar School place irrespective of their child's aptitude on the one hand, and on the other, by the activities of a number of primary schools as they saw the proportion of Grammar School places gained by their pupils as a measure of their school's efficiency and so contributing to its prestige rating. Coaching and practice in the working of intelligence tests resulted in non-educational outcomes and failure to realise the aim expressed in the 1943 White Paper on Educational Reconstruction (para. 15-17) that Junior Schools should be free to foster 'the potentialities of children at an age when their minds are nimble and receptive, their curiosity strong, their imagination fertile and their spirits high'. At the same time, parental pressure led to children having nightmares and other emotional disturbances.

Nevertheless, the selective tests were successful in identifying at least a proportion of the intellectually highly-able children in their generation and provided an educational ladder whereby they could develop their intellectual talents first through the grammar schools and subsequently in the universities. Many persons currently in senior positions within our society in the fields of medicine, science and other areas of intellectual endeavour were able to take advantage of this avenue for educational development. Among past scholarship-holders from elementary schools may be found, among others, those in the forefront of British politics today - Margaret Thatcher, Edward Heath and ex-Prime Minister Harold Wilson.

Comprehensive Schools

The replacement of the tri-partite system by a single comprehensive school appeared to provide a method whereby children could follow a secondary school course in which they were both suited and interested without the need for them to be separated into rigidly separate groups. Pedley (1969, p.20) has described the comprehensive secondary school as simply an extension of the comprehensive primary school. He states that this would not involve a featureless levelling out which 'would be a denial of all we have learnt from psychology and education.' (p.22). He continues, 'The differences between individuals are infinitely variable and complex; and our aim is the full development of everyone's talents'. In order, however, to provide a choice of courses wide enough to meet the varied requirements of all its pupils, and particularly of sufficient alternatives at the sixth form level, it was seen that to be economically viable the comprehensive schools should be large - taking in about two thousand pupils or more. As in the case of primary schools, specially-trained teachers were to be appointed for backward children and such pupils were to be grouped in small classes to help them master the basic skills and so enable them to take their places in normal classes at the earliest possible moment. Pedley expresses the belief that the comprehensive system has allowed a larger proportion of pupils to take G.C.E. and C.S.E. examinations and has resulted in 'better overall standards (ibid. p.102). He comments that, 'grouping by ability early in life tends to fix the expectations of teachers and of the children themselves at that level - so development which might have taken place is instead restricted,' and he continues, 'A growing body of evidence indicates that better overall standards can be obtained in the freer situation of the unstreamed group.'

The supporters of the comprehensive school usually appear to give their attention to those within a group who are lower in either ability or attainment or both and to emphasise that, by placing such children in a group where the general level of performance is higher, the expectation under such conditions of the teachers and of the children themselves will be such that the standards of the less-able will be raised. Comment is rarely made regarding the corollary of this conclusion - that the inclusion of children of a lower level of performance will correspondingly lower the expectations of the able children within the group and so reduce their work towards the class mean. Such results may occur notwithstanding an overall raising of standards since, on the assumption of an approximately normal distribution of both ability and attainment within a class, there will be more children at the mean or just below this standard than are at the higher levels. Accordingly, the number of pupils drawn 'up' by the inclusion of relatively fewer able pupils within a group is likely to be greater than the number of intellectually advanced pupils who are drawn 'down'. Furthermore, as already stated, the backward children receive special assistance in order to raise their standards so that in this way, too, the overall average is likely to be raised. One sees, then in operation in the comprehensive school today the same phenomenon which was noted by Burt in the elementary schools of 1916 when he referred to a "strong disposition to level a child's school-work up or down towards the common standard for his age," and too, as later he commented, 'In general, it is the most gifted of all whose attainment falls most seriously below their real capacity.' It seems that Pedley's remark, "Everywhere there is a due concern that all children, regardless of ability or home background, should have maximum opportunity for self-fulfilment; and along with this a concern for excellence" - excludes those who have previously shown themselves to be intellectually the most highly endowed and/or academically the most advanced. This view appears to be supported by a report of Dahllof's findings in Sweden (T.E.S. 6.6.1969) from which it appears that fourteen-year old boys and girls in selective schools required three-fold less time on elementary arithmetic than their contemporaries in the comprehensive system, the shorter time spent on such work in the selective schools allowed periods to be devoted to advanced topics. The article continues, "These figures imply that in selective schools or classes children learn faster and consequently are able to cover more ground or do exercises of a more demanding nature than is generally the case in a non-selective environment".

This then raises the question of whether selection should be practised. If so, how and in what manner should it be brought about?

As shown above, the view is generally accepted that the group in which a child is placed will affect his/her standard of scholastic performance, there being a tendency for individuals to work towards the norm for the group. It is generally recognised that a child's standard of work at any given time will be at least partially the result of three influences, his past educational experience, his social class and his genetic endowment.

SELECTION FOR SPECIAL EDUCATIONAL PROVISIONS

Unless one holds that every child should be treated in the same manner irrespectively of physical or mental attributes, then selection becomes necessary. The view that Remedial Departments should be dispensed with was expressed recently by a specialist remedial teacher in a Comprehensive School in this country (Haigh, T.E.S. February, 1976). He suggested that it should be replaced with a system of individual academic counselling of every child and the movement of children about between teaching units, "so as to secure for them the most effective track across the curriculum." This suggestion is put forward since, referring to the present British system of education, he holds, "It is a system which works extremely well for those who are suited to the chosen rate and direction of travel, but it has the greatest difficulty in accommodating those pupils who want to go more slowly, or more quickly, or whose particular talents do not fit the accepted style of operation."

Under the current British State educational system selection is practised for those afflicted with physical handicaps such as limited sight or hearing ability, etc., and for those classified as 'slow-learners' or for immigrant children. Additional educational provisions are made for children in these groups by giving specialised instruction and/or equipment and a lower teacher-child ratio to those below average in achievement. It follows, then, that unless selection is undertaken for the gifted child, selection itself is being used selectively - that is - it is being used in a discriminatory manner not according to the special needs of all specialised groups of children but for the special needs of only selected categories of such groups.

The philosophical question as to whether special educational provision for some children is undemocratic is raised in the Report to Congress of the U.S. Commissioner of Education on the 'Education of the Gifted and Talented' (1972) which states that special provisions may be held to be so, 'If democratic educational practice is interpreted as the same education for all...' (p. 25) and continues, 'If we believe that democratic education means appropriate educational opportunities and the right to education in keeping with one's ability to benefit, the answer is no.' The Report adds that if the former view is adopted, 'then all special educational programs will disappear and hundreds of millions now expended by the States and the Federal Government will be diverted to other uses.'

If it is agreed that distinctions should be made with regard to educational provisions, then further questions present themselves:- (a) whether the means are available whereby the selections may be made with an acceptable degree of accuracy; and (b) how will the resultant groups be organised once the classification has been undertaken. As applied to intellectually highly-able children, the first of these questions raises further issues involving:- (i) a definition as reagrds the delineations of this type of giftedness, (ii) an estimate of the extent to which developed giftedness is the result of innate or or environmental factors as shown by the present state of knowledge in the fields of both theoretical and applied psychology, and (iii) the availability of tests designed to measure high intellectual ability - i.e., that found to be approximately two-and-half standard deviations or more above the mean of general intelligence tests.

MODERN PSYCHOLOGICAL VIEWS ON THE INTELLECT

Before considering high intellectual ability with regard to a particular sample of children, it is necessary to review briefly modern psychological thought regarding variations between the cognitive functioning of individuals. For this purpose models of the cognitive structure will be considered.

Models of the Cognitive Structures of Abilities

Bloom in his 'Taxonomy of Educational Objectives' (1972) refers to intellectual abilities as representing combinations of knowledge and intellectual arts and skills, the latter referring to a capacity for dealing with problems. He continues, expressing the view (p.39) 'Justification for the development of intellectual abilities and skills can readily be derived from a consideration of the nature of the society and culture in which we live...' He goes on, (p.40) referring to our society in the twentieth century and to rapid and unpredictable changes in our culture, that all that educationalists can do to prepare 'individuals for problems that cannot be forseen in advance' is to help, 'the student acquire generalised intellectual abilities and skills which will serve him well in many new situations.' Later, (p.41) he continues regarding the importance of intellectual abilities and skills to the solution of the student's own problems as affecting the individual's maturity and adjustment and concludes, 'It is recognised that unless the individual can do his own problem-solving he cannot maintain his integrity as an independent personality'. Bloom believes that, 'The concept of the individual as a member of a democracy' is closely allied to that of maturity and integrity.

One may suggest that part of a definition of ability in the cognitive realm might be that it is an attribute which is of assistance to its holder in achieving his/her desired ends.

Since an early period in the study of the concept of 'intelligence' there have been differences in the models set up to represent it - in particular between the paradigm put forward by Spearman (1904) and the alternative view postulated by Thurstone (1938).

Spearman saw 'General Intelligence', subsequently referred to as 'g', as part of a hierarchical structure, which 'All branches of intellectual ability have in common' in the form of one fundamental function (or group of functions), 'whereas the remaining or specific elements of the activity seem in every case to be wholly different from that in all the others'. Vernon developed this approach with his hierarchical group factor theory in which below a pervasive 'g' may be found two main groups of abilities: 'the Verbal-Numerical-Educational on the one hand, (referred to as V:Ed factor) and the Practical-Mechanical-Spatial-Physical on the other hand (referred to as K:M factor). These basic factors may be sub-divided in turn into a number of sub-factors (Vernon, ed. Wiseman, 1967, p. 179).

In contrast, Thurstone's model of cognitive ability shows a number of 'Primary Mental Abilities' (P.M.A.) such as Verbal Ability (V), Number Ability (N), Word Fluency (W), etc. but 'g' is not envisaged as running through all these various abilities.

The fore-going models provided a basis for the development of more sophisticated models of structures of cognitive ability, namely, those put forward by Burt and Guilford.

Burt postulated a hierarchical model of the intellect in which group factors are involved in cognitive processes at a number of different levels. Commencing with the lowest level 'A' - Simple Sensory Processes and concluding with level 'E' - General Processes "which appear at every level', he divides up cognitive activities into separate categories. He sums up saying, "Intelligence, so far as it results from cognitive (or directive) rather than from dynamic (or motivational characteristics) being merely another name for 'General Mental Efficiency'." (Burt, 1949). More recently, (1975) when referring to intelligence tests, he says, the term 'intelligence' was "originally adopted as a convenient shorthand name for a well-defined concept, namely, 'inborn, general cognitive capacity."

A fourth model of intelligence which has made considerable impact upon theorists is that of Guilford (1959) who considers three aspects of the intellect, (i) that involving operations such as evaluation, cognition, etc., (ii) the results of such manipulations as shown by classification, transformations, etc.; and (iii) mental 'content' such as perceived directly through the senses or through systems of symbols representing the basis upon which the former two sequences occur. Guilford's model is represented by a divided block showing the three dimensions he has categorised.

At the 1969 Toronto Symposium the concept of 'intelligence' was discussed by both theoretical and applied psychologists. In summing up the conference Butcher (ed. Dockrell, 1970) reported that several of the participants had seen the concept 'intelligence' as a primitive idea, surviving from the early days of psychology. Bereiter and Olson thought the need was to interpret intelligence (and more specific skills) 'as socially determined and indefinable except in reference to a particular culture or sub-culture.' To Butcher it appeared that the main justification for the retention of the concept of 'general ability' by the conference, 'lay in a logical or psychological necessity to postulate a super-ordinate co-ordinating ability'. It was felt that granted abilities such as Verbal and Numerical factors were found, there must be occusions when the individual needed to co-ordinate such skills. Moderately favourable evidence as to the practical usefulness of 'general ability' was expressed in the conference discussion. Dockrell in his Introduction to the conference Report gave strong support for the retention of the concept of 'intelligence' since an empirical need for it existed. He said, 'A casual survey of the research journals in education shows that the concept of intelligence is used as an experimental or control variable in well over 50% of the studies reported.'

The participants of the Toronto Conference were in general agreement regarding the empirical importance of the concept of intelligence since in every-day affairs decisions were made regarding individuals whose lives were affected according to how they were rated in this respect. That being the case, the contributors concerned themselves with improvements in the construction and interpretation of intelligence tests both from a theoretical and applied viewpoint.

Warburton discussed the development of the new 'British Intelligence Scale'. He commented, 'The empirical value of the construction of individual tests is not questioned but its contribution to the general theory of mental functioning is slight because of the lack of adequate rationales.' He continued later saying that, 'A major criticism of the individual tests is that they fail to sample factors of mental abilities identified in factor analytic research by Burt (1954), Thurstone (1938) and Cattell (1958),' but he judged Guilford's 'Model of the Intellect' (1967), in which 120 abilities were categorised by content, process and product, to be too complex for use in individual testing. Accordingly, the new B.I.S. sought to strike a balance between Thurstone's classification of the 'Primary Mental Abilities' (1938) and the hierarchical structure of the intellect postulated by Burt (1948) and Vernon (1960). As regards the two generally best recognised individual tests, Terman's 'Stanford-Binet' and the 'Wechsler Scale', Warburton says that Terman (1916) attempted to measure 'the primacy of conceptual thinking largely mediated by language', while Wechsler (1958), 'took a global view of intelligence, according to the importance of 'g', yet pointing to significant performance elements'.

In his contribution at the Toronto Symposium, Vernon stated that teachers, personnel selectors and psychologists are all 'faced with individuals who differ widely in traits and abilities' about whom decisions must be made so that categorisation, and if possible measurement, of such characteristics can be made. Vernon believed that judgement of brightness v. dullness is 'one of the most useful and far-reaching in its implications for decision-making. He notes that, despite Thurstone's and Guilford's improved multi-factorial representations of the intellect, practitioners 'continue to use Terman-Merrill, Wechsler Scales or group tests of general intelligence as their prime instruments.' This is in spite of the fact that 'The measure of intelligence or other cognitive factors provided by the applied psychologists are merely rather coarse indices,' and that these 'provide little information about the nature of the learner, concept formation or reasoning processes,' which are of interest to general psychology.

Merrifield (1969) in his contribution states 'One needs to know how the set of individual abilities measured by the tests in predictive of meaningful school-related performances.

The present author's study of gifted children is based upon a measure of their intelligence and of their performance on tests of scholastic attainment. It derives its function from the assumption that the display of more or less intelligence may lead to more or less success in standards of attainment. While the study is not itself concerned with predicting subsequent achievement, the implicit assumption is made that higher intelligence, as measured by the Stanford-Binet test, is a necessary pre-requisite for certain forms of higher intellectual attainment. That this is the case is a matter of empirical experience but whether the reason for the greater capacity for intellectual learning results from more or less of three possible components, 'previous knowledge, motivation and intelligence' (Dockrell, 1970) is a matter about which disagreement exists between psychologists.

Returning to Merrifield, at the beginning of the same paper he states his concern for children's problems in school and his hope that by making predictions about behaviour "such predictions might contribute to the optimal placement, training, and educational development of children." His work appears to have important applications to gifted pupils. He discusses Gange's 'Lateral Transfer' and 'Vertical Transfer' - that is, in the former case, when a learner transfers his knowledge to a different task at about the same "level of complexity", and in the latter situation, "when the learner assimilates super-ordinate concepts or principles on the basis of his knowledge of sub-ordinate principles". Further, referring to Guilford's three-dimensional 'Model of the Intellect' Merrifield suggests that, "Evaluation should incorporate abilities to deal with ambiguity and uncertainty," so that there might be separate measures of cognitive thinking and for decision-making. He gives a telling analogy when he says, "There is no more reason for a single factor of intelligence than for height to be the sole measure of physique." His proposal to widen the factors to be sampled by an intelligence test seems likely to provide a theoretical basis for a more sensitive instrument in the future capable of detecting an increased number of the special abilities possessed by gifted individuals.

The paper presented by Evans to the Toronto Symposium (1969) attempts a general, theoretical explanation of individual differences in intelligence and problem-solving ability for which he adopts a facet approach as regards the effects of the influences involved. These are:-

R: Reinforcement: - "It is assumed that all cognitive functions or knowledge have been learned" and that "the learning which resulted in these functions or knowledge was at some point, and by some means, either intrinsically or extrinsically positively re-inforced." Evans postulates that, "the environment in which a person develops supplies a general pressure to re-inforce some types of learning, while other learnings are differentially re-inforced, i.e. for some persons not re-inforced at all."

G: Innate, Cognitive Capacities: - a theoretical construct of a possibly multi-variate nature.

P: Other Innate or Acquired Personality Characteristics, almost certainly of a multi-variate character.

T: Appropriateness of School Instruction.

H: Quality of out-of-school environment, including Home Environment.

The above influences are seen to be weighted variously in their contributions to the variability of the individual as follows:-

1) General reasoning: - The quality of this ability is seen as arising largely from learning in the home environment and the "innate biological equipment of the learner." It is suggested that while other personality and school factors vary they are relatively unimportant.

2) Simple Group or Primary Factors, e.g., N or V: - It is postulated that individual differences here arise from differential general re-inforcement resulting from variations in home background and schooling. "The effects of innate, cognitive factors and personality variables are postulated to be of lesser consequence."

3) Complex Concepts Resulting from School Education:

4) Problem-Solving Skills Additional to (1), (2) and (3).

As regards (3) and (4) above, Evans merely comments upon the unsatisfactory state of our knowledge.

The above theoretical model has relevance for the educational needs of gifted as well as of other children. Given, 'innate, cognitive capacities' and the learner's 'home environment', then the appropriateness of 'school instruction' and the 'general pressure' of the environment are seen to be important for Primary Factors such as N or V. The present author suggests that the two influences pin-pointed by Evans in this paper, namely, the effects of re-inforcement and of the general environment, may affect gifted children (as well as others) in two ways:-

(a) the effect on a gifted child's mental development of the educational provisions made - that is, the instructional environment, curriculum, etc. and,

(b) group pressures to conform to peer group norms regarding the rate of learning of curriculum material and the standards of attainment reached in it.

The situation of the gifted child as regards both (a) and (b) above differs from that of the majority in that unless special provisions have been made, the educational environment both as regards the educational provision made and the pressures exerted by the peer group will be such that the learning made by the gifted children will be geared to comply with low teacher expectations and they will have an incentive to conceal their intellectual abilities from their peers - that is, to become the covert gifted. Such unintended 'learnings' will find re-inforcement in the day-to-day experiences of school life.

To refer further (p.1) to Jensen's controversial paper, 'How Much Can We Boost I.Q. and Scholastic Achievement' (1969), the view expressed there is that compensatory educational programmes such as 'Project Headstart' have apparently failed and he quotes the U.S. Commission on Civil Rights, 1967, which concludes:- "That none of the programs appear to have raised significantly the achievement of participating pupils as a group." Jensen believes that such educational schemes were based upon two related theories:-

(i) 'The Average Child Concept' - the belief that all children with rare exceptions were basically similar in their mental development and capabilities and that apparent differences in school were due to superficial differences in the children's home background and out-of-school experiences. Accordingly, the theory was postulated that if all children could be treated alike early enough, their rate of scholastic learning and levels of achievement would be similar.

(ii) 'The Social-Deprivation Hypothesis' - the postulate that pre-school educational compensatory programmes can off-set pre-requisites for scholastic learning lacking in the children's home background.

Jensen states that the success of such efforts are usually assessed by gains in I.Q. and scholastic achievement, but since I.Q. is known to predict scholastic performance better than any other single measureable attribute, "so it is believed, rightly or wrongly, if the I.Q. can be raised academic achievement will take care of itself given normal motivation and standard instruction." Accordingly, he next turns to the nature of intelligence.

In this connection Jensen stresses that we can measure intelligence although we do not know what it is (like electricity). This can be done since the measurements made, 'bear some systematic relationship to other data.' After a review of the development of intelligence tests, he discusses whether 'g' is a 'unitary ability or a conglommerate of many sub-abilities,' and proceeds to the conceptual distinction made by Cattell (1963) between 'fluid intelligence' - which Jensen gives as, 'the capacity for new conceptual learning and problem-solving, ... relatively independent of education and experience, which can be invested in the particular opportunities for learning encountered by the individual in accord with his motivations and interests.' 'Crystallised intelligence' is however, Jensen continues, 'a precipitate out of experience, consisting of acquired knowledge and developed intellectual skill.' At a later stage, Jensen discusses the notion of a "fixed" I.Q. He argues that the I.Q. is a phenotype which is the result of the individual's 'internal genetic mechanisms and all the physical and social influences that have impinged upon him', and that while the individual's genotype is "fixed" at the moment of conception whatever we measure is a phenotype and this is not "fixed". 'The square of the correlatio between genotype and phenotype is technically known as the 'Heritability' of the characteristic'. Later Jensen states that the I.Q. is not constant but has about the same degree of stability as other developmental characteristics of physique.

Applying the foregoing postulates to the needs of gifted children, in order to achieve the full development of their potential, it may be deduced that in spite of their high intelligence this might be raised higher still. Whether one takes Cattell's division of 'g' into 'fluid' and 'crystalline' intelligence, or Jensen's concept of 'heritability', the actual development of the degree of displayed intelligence is seen to owe something to the scholastic environment since both innate ability and subsequent learning whether at home or at school are determinants of the level of scored intellectual capacity. This is a separate issue from the extent to which such intellectual ability has opportunity for its application in the scholastic environment or as regards to the degree to which the gifted individual is motivated to utilise his/her intellectual capacity in scholastic learning.

In his paper at the Toronto Conference (1969) Jensen distinguishes between two levels of ability both of which are seen as largely genetically conditioned. These are as follows:-

(1) Level I Ability: - 'The capacity to receive or register stimuli, to store them, and later to recognise for recall

the material with a high degree of fidelity'. There is a lack of any need to elaborate, transform or manipulate the input material in order to arrive at the desired output.

(ii) Level II Ability: - This 'is characterised by transformation and manipulation of the stimulus prior to making the response. It is the set of mechanisms which make generalisation beyond primary stimulus generalisation possible.'

Jensen concludes that 'school success is highly predictable from standard I.Q. tests' as it is mainly aimed at Level II ability. He argues that present-day schooling is 'highly geared to conceptual modes of learning,' and that these are 'suitable for children of average and superior Level II ability'. He continues by saying that many children are weak in this conceptual ability and 'therefore learn far less than would seem to be warranted by their good Level I learning ability'. Such variability between children may be catered for by 'capitalising on the inter-action of abilities and methods of instruction.'

If such 'Aptitude x Instruction Inter-action' programmes can be developed it seems that material could be produced which would be of benefit to the gifted as well as to those children strong on only Level I learning. However, programmes directed towards Level II learning devised as suitable for average children would be unlikely to be of sufficient difficulty to stimulate superior pupils. It is improbable that such material would be sufficiently complex to tax the intellectual capacity of pupils who obtain an intelligence test score two-and-half standard deviations or more above the mean. Accordingly, the introduction of this new and broader theoretical concept of learning, which opens up the perspective of new distinctive ways of assisting children's learning, promises benefit to children at both ends of the conventional intelligence continuum.

ORGANISATION OF CHILDREN'S LEARNING

Faced with the occurrence of marked individual differences between children, diverse educational theories and practices have emerged in the Western industrial countries in the twentieth century. These may be categorised under the following headings:-

(1) Formal Educational Institutions:
  (a) children divided into year-groups according to chronological age, each group being taught as a unit a package of pre-selected curriculum material, and
  (b) fluid, self-selected groupings of children studying an un-predetermined curriculum.

(2) Non-Institutional Education:
  (a) Formal individual tutoring, and
  (b) Unstructured learning in society at large.

Although protagonists of each of the above categories of educational method may be found, practical outcomes are most often a combination of one or more of the above divisions.

(1) Formal Educational Institutions

(a) Traditional Methods:

These may be typified as the teaching methods practised by schools of the traditional type. Children are rigidly divided by chronological age and the content of the curriculum is closely delineated for each age-group. The numbered Grades and Standards for yearly age-groups of infants and seniors in the schools mentioned by Burt in his London Surveys of 1916 exemplify this method of organisation. Schools practising the traditional method whereby all the children in a school class opened the same text-book at the same page on the same day may still be found in the 1970's, but this teaching method is nearly always only adopted for a segment of the curriculum and for a part of the day.

The advantage of the instructional approach is that it ensures an attempt to teach all the children what is considered to be the essential curriculum material - normally this covers the 'Three R's', that is Reading, Writing and Arithmetic. The need for such learning is universally recognised in Western industrial society and is uttered even by those holding diametrically opposed views on educational philosophy to those expressed by the traditionalists. In this connection the words of Edward Short, (1971, p.114) are pertinent:-

> "The ability of human-beings to communicate information, ideas or feelings to their fellows, rapidly, accurately and fluently, has always been a primary factor in man's evolution... It is the major educational skill upon which all learning and growth of personality depend."

The disadvantage of such a rigid structuring of educational curriculum content and organisation as outlined above is that it makes no allowance for individual variations between pupils. However, in most cases its modern application allows for differences in children's speed of operation since, once the prescribed amount of work has been completed to the teacher's satisfaction, the child may move on to other material. Under this system the gifted pupil is likely to experience both frustration and to be obliged to waste his/her learning time since he/she has normally mastered elementary work in connection with the 'Three R's', or other similar curriculum material, well before such learning is appropriate for an unselected school class of the same chronological age. That this is likely to be the case is supported by the statements in the Report to the United States Senate of the U.S.

Commissioner of Education on the 'Education of the Gifted and Talented' (1972) which says:-

> "Typically half of the gifted have taught themselves to read before school entry. Some of them learn to read as early as two years and appreciable numbers are reading at four. In comparison with their class-mates, these children depart increasingly from the average as they progress through the grades, (and in italics) if their educational program permits."

By Friere (1972) it is held that the traditional method of teaching results in 'The student-teacher contradiction' and 'the banking' concept of education in which the scope of action allowed to the learner 'extends only as far as receiving, filing, and storing the deposits'. While such criticisms are usually valid for those individuals who diverge from the school class average, such as the gifted, the less-able, some categories of the physically handicapped, etc., for the great majority to whom the teacher's exposition regarding a body of knowledge is geared, it may be that the transmission of information in this way is the most economical of the children's learning time. For most children, although the quality of learning may be poorer when the individual is 'told' rather than encouraged to 'find out', the difference in the quality of the learning as a result of the two methods may not be justified by the differences in the amount of time required in respect of the two approaches. This raises the question as to whether the teachers' function is to assist their pupils to teach themselves or, in addition, to instruct the children. Breese (1973) says that if each child works individually, motivated entirely by intrinsic interest with virtually no class teaching and help is given individually or in small groups, the teacher still requires to know what each child is doing and if he has thirty pupils he will be able to give only ninety seconds to each in forty-five minutes. He believes that, 'the advantage of homogeneous grouping is that it economises the use of the teacher's time'. Elsewhere (OECD, 1973, Indicators of Performance of Educational Systems) the 'transmission of knowledge and skills' is given as the first of five goal areas specified as the function of educational systems.

As regards the academically gifted child, if it is conceded that the tasks of the teacher include assisting the child to learn, teaching by expounding on the written or visual material provided for the pupil, and responsibility for the transmission of knowledge to all those in his/her class (including the intellectually able), then it must be seen that the range of material is sufficiently diversified in subject matter and in level of complexity to meet the span of mental ages possessed by school classes of children of the same chronological age.

(b) Fluid, Self-Selected Groupings of Children Studying an Un-Predetermined Curriculum:

A. S. Neill's theories and 'Summerhill' (Hemmings, 1972) supply an example of a 'Free School' in which children are at liberty to learn as, how, and what they wish. Hemmings gives a clear account of the experiences of, and the rationales behind, the experiments in giving full freedom of choice to children. 'Free schools' are also discussed by Richmond (1973) who says, 'Children should not be denied the right to do 'nothing' for by so doing one may be denying them the opportunity to do something which is of real value to themselves'. (p.71). He continues, stating that skill in reading is not difficult but that the right environment for learning must be provided and he remarks, (p.72):-

> "When children do not learn to read with this ease, rapidity, and power, it is because the conditions are not right, because

> they are not learning for their own reasons, to meet their own felt needs, or because we have made the task needlessly difficult, obscured what was already clear... or because the children have somehow been blocked off from the full use of their powers.'

The above remarks, it seems, might be very applicable to highly intellectual children - such pupils might well appear to be doing nothing but in fact be developing their original thought - likewise such children do learn to read speedily provided they are given reading material which interests them. However, the Report (op.cit. OECD, 1973) draws attention to the fact that a student may choose not to educate himself - if he sees the kind of education offered as being of no value within his set of preferences. Since even the exceptionally intelligent (on I.Q. Scale) are unlikely to be able to foresee the future benefits of present study, unless they find the material presented of current intrinsic interest, they too may opt out of learning.

Holt (1973, p.242) gives the educative mission of promoting the growth of their children as being the prime function of schools. He says:-

> "We want to do what we can to help every human-being grow and develop in every way to the fullest extent of his capacity - in among other things, awareness, responsiveness, curiousity, courage, confidence, imagination, resourcefulness, patience, generousity, sympathy, skill, competence, and understanding; in the ability to see a wide range of choices, to choose wisely among them, and to recognise and change choices that prove to be unwise; ...in a strong sense of his own freedom, dignity, and worth, and of those same qualities in others."

(2) Non-Institutional Education

(a) Formal Individual Tutoring:

Burt (1975) states that in his experience children who have been taught wholly at home by highly intelligent parents or by competent tutors have progressed in the more elementary subjects at a rate, "on average nearly twice that of the average child". From such reports there seems little doubt that exceptionally intellectually able children in selective schools could progress very much more rapidly in their learning in many cases than the current provisions allow them to do. At the same time, it may perhaps be added that socialisation among their peers, physical activities and custodial care must also be numbered among the school's functions. Nevertheless, there seems no reason why these tasks should prevent schools from promoting the maximum rate of learning of academically gifted children as well as of all their other pupils.

(b) Unstructured Learning in Society at Large:

A case for a 'de-schooled society' has been made by a number of modern authors, including Friers, (1972), Illich (1973), Holt (1972, 1973) and Reimer (1971).

Friers has primarily been engaged with teaching illiterate adult peasants but Holt, Illich and Reimer have all been concerned particularly with children's learning. Holt (1973) defines a 'deschooled society' as one in which, "Nobody would be compelled to go to school, neither by the law nor by the threat of joblessness, poverty, discrimination and exclusion from society" (p.190). On the other hand everyone would have the "widest possible and freest choice to learn whatever he wants to learn, whether in school or in some altogether different way." Illich (1973) accuses the schools of leading men to "abdicate the responsibility for their own growth" (p.65). He believes that it is an infringement upon the personal liberty of children and young persons to oblige them by law to attend school. As an alternative he proposes that education should be available to all who require it at any time in their lives and suggests a system of 'peer-matching' whereby there might be a free exchange of knowledge and skills between equals. He says:-

> "Increasingly educational research demonstrates that children learn most of what teachers pretend to teach them from peer groups, from comics, from chance observations and above all from here participation in the ritual of school. Teachers, more often than not, obstruct such learning of subject matter as goes on in school."

Reimer, too, (1971) refers to the importance of learning from peers - whom he defines as, "equals deriving mutual benefits from their relationships. They can play tennis together, go exploring together, study mathematics together, or build a camp together". (p.119). Both Reimer and Illich see the need for true intellectual leadership and (the latter, op.cit. p.103) for the "desire of gifted people to provide it" since Illich sees such as obviously necessary in our society. Reimer goes further in this direction and says, "The need for people with real ability in administration, teaching and scholarship will increase and their rewards in terms of educational achievement, professional freedom and income will also increase." (p.121).

Examples of the occurrence of 'de-schooling' in this country and in the United States are given by Richmond (1973). He outlines the 'Parkway Program' in Philadelphia as an example of how students may be sent out into the community to learn from real life, while in this country he refers to, 'The Scotland Road Community Trust', which was established in an educationally deprived area in 1971 with five children but soon had thirty pupils on its roll. The prospectus of the school claimed that it would be totally involved with its environment but it possessed no library, timetable or schemes of work. A similar 'school' has more recently been set-up by parents who have established a teaching group over a public house because of their dissatisfaction with the schooling offered to their children by the Local Authority. (T.E.S. 13.2.1976).

Such unstructured educational provisions as envisaged by the 'de-schoolers' may well offer opportunities to intellectually exceptional children to develop their special cognitive or other abilities without a 'lock-step' of chronological age and with the freedom to spend un-metered periods of time with established masters in a wide spectrum of human endeavour - so attaining untold heights of achievement. Nevertheless, the question must be asked as to whether the individual can reach his full development as a human-being without at the same time being both adjusted to, and integrated with, the society into which he was born or has found his place.

GIFTED CHILDREN IN MODERN INDUSTRIAL SOCIETY

In twentieth century Western society there is largely a consensus of opinion on the desirability of equal educational opportunities being given to all children. This quite obviously does not mean that all educational programmes should be identical since children may be seen to differ both in their physical and mental abilities - but it does mean that all shall have an equal chance to realise their own attributes. Burt says (1975) that each individual should have the opportunity "to develop the peculiar gifts and virtues with which he is endowed - high ability if he possesses it; if not, whatever quality of body, mind and character are latent within him." He agrees with Hollingworth, (1952, p.287) when she says, "that a child with I.Q. 140 can master all the work provided in the elementary school as ordinarily established, in half the time allowed; and a child of 170 I.Q. can do all the studies required with top marks, in about one-fourth of the time" - but he adds that such children are also characterised by "a quicker insight, a more retentive memory and a great keenness and industry." (p.195). He believes "that, unless adequate provision is made to meet their needs and capabilities, such children are liable to waste half their time and as a result to feel frustrated and dissatisfied." He states that it is in the case of the bright children from a poor background where the outlook of friends and relatives sees financial gain as the immediate objective rather than educational advancement, where the worst problems arise. Such children soon discover that, "their own intelligence is superior to that of their parents and teachers. They become restless and resentful and their main object is to break loose from school and home and secure an independence of their own." (p.196). Burt continues, "Plainly these quick learners confront the educationalist with practical problems that are even more urgent than those of the 'slow-learners'." He sees the gifted children's real need to be a plan of study which will give them clearer understanding of ordinary life and help them to become familiar with, in Matthew Arnold's words, 'The best that has been thought and said in the world'.

The identification of gifted children and an examination of their special needs is not a mandatory duty on Local Education Authorities in the United Kingdom. However, in the United States the law requires (Section 806(c) of Public Law 91-230) that the Commissioner of Education shall determine the extent to which special educational assistance programmes are necessary to meet the needs of gifted and talented children, evaluate existing programmes and recommend whether new ones are needed. On the basis of the information submitted a Report on the Education of the Gifted and Talented was made to Congress in 1972. In this document, gifted and talented children are said to be those identified by recognised means as those capable of high performance in any of the following areas: (p.2)

"1) general intellectual ability
2) specific academic aptitude
3) creative or productive thinking
4) leadership ability
5) visual and performing arts
6) psychomotor ability"

It is envisaged that the gifted and talented will encompass a minimum of 3% - 5% of the school population. The advisory panel established three characteristics for a differentiated educational programme as below (p.11):-

"1. A differentiated curriculum which denotes higher cognitive concepts and processes.
2. Instructional strategies which accommodate the learning styles of the gifted and talented and the curriculum content.
3. Special grouping arrangements which include a variety of administrative procedures appropriate to particular children, i.e., special classes, honor classes, seminars, resource rooms, and the like."

Among the main findings of the study undertaken for Congress are that (p.3):

> "There is an enormous individual and social cost when talent among the Nation's children and youth goes undiscovered and undeveloped. These students cannot ordinarily excel without assistance."
>
> "Gifted and talented children are, in fact, deprived and can

suffer psychological damage and permanent impairment of their abilities to function well which is equal to or greater than the similar deprivation suffered by any other population with special needs served by the Office of Education."

In view of the growing concern regarding the educational provisions for gifted children in the United Kingdom it was thought desirable that a pilot field study should be undertaken to obtain information regarding the scholastic attainments, relative to their ability, of a sample of gifted pupils in primary schools and at the same time to elicit views from the children themselves, their parents and their teachers regarding their school situation and preferred occupations. The project received financial support from the Social Science Research Council and administrative assistance from Mid-Herts College of Further Education, Welwyn Garden City.

Chapter 3

REVIEW OF THE LITERATURE

Children of outstanding ability have been a subject of study over a long period; particularly noteworthy are the contributions made by Burt in the earlier part of this century. Interest in the education of gifted children intensified during the early 1960's (Yearbooks of Education 1961, 1962) and may be summed up by Lawrey's statement in his introduction (1961, p.1), "All civilised societies have accepted as a duty the task of encouraging those with talent to cultivate their gifts and pursue excellence", and he continues later, "Such men and women can then promote the general welfare of the group to which they belong". While considerable attention has been given to the problems of educating 'gifted' children in the United States over a number of years (Gallagher, 1960), in this country the work was more limited. Recently, several studies have been published concerned with the upper end of the intelligence scale (Bridges, 1969; Deakin, 1972; Hitchfield, 1973; Ogilvie, 1973), the latter two being more broadly based than the former. Most recently (1976), there has been a report of the first World Conference on Gifted Children.

Little work has been undertaken specifically regarding the school attainment levels of children in the top 2% of intellectual ability of their age group, as measured by intelligence tests. At the same time, considerable effort has been directed towards finding whether the 'pool of ability' among the young of this and other countries was being fully utilised, (Yrbk. of Ed., 1961 & 1962, Husén, O.E.C.D., 1972). The searchlight seems to have been directed towards the top 20% or 25%, of else towards undeveloped or undiscovered ability among deprived children, the apparent 'slow-learner' (Reisman, 1962), or immigrant groups. On the other hand, if a highly-able child has been performing at the upper end of the continuum of attainment for his school class, this has generally been accepted as satisfactory, but Tempest (1971) asks whether if a child is just 'doing well' in school, this in fact is good enough if his I.Q. is 140. The question seems to be whether highly intellectual children, when performing at a level rather higher than their peers, are also working up to a standard which is appropriate bearing in mind their potential, or whether there is waste of talent in these circumstances.

United States Research Studies

Concern over the waste of our human resources has led to a number of studies on the nature and distribution of 'gifted' children, the most notable of these being that commenced by Terman and his associates in the 1920's, when a sample of 1,470 'gifted' children were located in California. Other authors concerned with one or more aspects of the field are Hollingworth, Hildreth, Oden, Torrance, Getzels and Jackson, Gallagher, Barbe and Renzulli. Although all these authors have been concerned with 'gifted', 'creative', or highly talented children in general, their interpretations of these terms have varied, as have the breadth or narrowness of the groups they have included within their definitions.

Studies of highly intelligent children have faced two initial tasks.

The first has been the selection of suitable tests whereby children falling above the 99th percentile of abil9ty may be identified. When dealing with individuals at the extreme upper end of the distribution, problems relating to methods of measuring both potential and attainment, whether in the intellectual area only, or even more so, in the difficult field of creativity or other diverse talents, are increased. Psychometrists such as Vernon (1940, 1961) and Thorndyke (1963) have warned of the statistical pitfalls that await researchers on account of imperfections in the instruments of mental measurements. Studies concerned with the extreme upper end of distributions of intelligence and attainment scores face the added difficulties that the tests have been less well developed. In the attainment tests, the testee may hit the ceiling of the test so that extrapolations must be made in order to reach a value, but in so doing, the margin for statistical error is increased.

Secondly, the selection of children of very superior ability, that is those who score an I.Q. at or above the 99th percentile in their age group, is an arduous task. Most researchers have used some combination of teacher nomination, group intelligence test scores, and either the Stanford Binet or W.I.S.C. test results to identify subjects.

Terman's Group of 1,470 Gifted Children

The most comprehensive and best known Study to date of highly "intellectual" children was carried out by Terman and his team in the 1920's. The pupils were selected by teacher nomination, age, and group and individual intelligence tests.

Once the objectives and methodology of the project of the study had been established, the first task of the research team was to identify children in the Californian schools who would rank within the top 1% of the child population in intellectual ability. Urban schools were visited and teachers of Grades 3 to 8 (children aged 8 to 14 years) were asked to nominate the three brightest and the youngest child in their respective classes, and to name the brightest child who had been in their class during the previous year. The selected children were chosen for subsequent examination on the Stanford Binet Scale. For children in Grades 1 and 2 (aged 6 and 7 years) teacher nomination and the Stanford Binet test were used but the group test was omitted. Since the objective was to identify children who would fall within the highest 1% of the school population, the score of 140 was taken as an arbitrary cut-off point. Subsequently 62 subjects were included whose score ranged from 135 to 140.

Even in this large study it is not certain that all eligible children were included. It is interesting to note that Terman says of the five kinds of nomination used, "The most fruitful single kind of nomination was that of the youngest in the class", (Terman, Vol.IV, p. 5). The selection by this method was dependent on the teacher's opinion and Terman admits that some children may have been missed who were, "less outstanding in school achievements or less vocal in classroom recitations than those who were discovered". He continues, "If you are allowed only one method of locating the highest I.Q. in a classroom, your chance of getting the right child is better if you merely look in the class register and take the youngest, than if you trust the teacher's judgement!" since, as he explains, "the tendency of teachers is to judge the intelligence of their pupils on the basis of absolute achievement, with little regard for age differences". (op.cit.p. 6).

Even so, the search yielded 661 children and these became known as the Main Experimental Group. Subsequently, a further 365 children were included as the result of volunteer testing in smaller urban areas. The two groups together totalled 1,026 children. With the addition of a group of older pupils and the inclusion of a number of younger siblings, the final number included in the study was 1,470. They were drawn from a total school population of about a quarter of a million.

The information collected about the children was most comprehensive. The group was given Attainment Tests in Arithmetic, Language Usage, Science Information, Literature, History, Civics and Art Information, lasting altogether a total of three hours; the pupils completed a battery of seven character tests, and details were sought from their teachers and/or regarding the children's home life, social background, physical development, health and recreational interests. The same information was collected in respect of a Control Group of unselected subjects.

Terman states that when the ordinary degree of backwardness is taken as a criterion of retardation, if the children's chronological ages were considered, then not a single child among the 606 was retarded; but if the gifted pupils' mental ages were substituted, then the situation was reversed strikingly. In the latter case the entire Gifted Group was retarded with the exception of four boys and two girls. The discrepancy between Mean Chronological Age and Mean Mental Age was 2.8 years in the First Grade when the children were six plus and this had increased to nearly five years when they were in the Fifth Grade (the 10-year olds). While approximately 83% of the Group were accelerated as against the Mean Chronological Age of the relevant Grade, the percentage of acceleration increased relatively little after the age of seven years and Terman concludes, "that most of the extra gain is made before that age". (Terman, Vol. 1, p.259). It seems likely, then, that the widening of the difference between

Chronological Age and Mental Age from 2.8 years in the First Grade to nearly five years in the Fifth Grade is a reflection of the latter finding. Some measure of the difference is given by the calculation of a 'School Progress Quotient'. This was found by dividing the Standard Age for an individual child's Grade by that child's age reckoned in the middle of the term. (Terman, Vol. 1, p.257/8). This procedure gives an Average Progress Quotient of 114 indicating, Terman believed, that the typical gifted child is accelerated in school by 14% of his age as compared with unselected children. The degree of advancement amounted to about one Grade (one year) at age seven to two Grades at age fourteen. He concluded, "The typical gifted child is about 48% of his age above the norm in intelligence and about 14% of his age above the norm in Grade location. The difference between 48% and 14% is 34%. From one point of view one might say that the gifted child is under-promoted to the extent of 34%, or approximately one-third of his age". Terman recognises that considerations related to social training may justify a good deal of the under-promotion but he continues, "As far as mere ability to accomplish is concerned it will be shown that some two-thirds of the under-promotion found with this Group is unjustified".

The research programme included the working of Stanford Achievement Tests by 565 of the subjects since, "Before intelligent provision can be made for the education of gifted children it is necessary to know what their accomplishments are under the present system: whether they are achieving to the limits of their abilities; whether they are being unduly retarded; whether they show an excessive tendency to unevenness, etc." (op.cit. p. 290).

The test results were computed for the separate age groups 7 - 15 years. Ample time was given for the children to work the tests so that they did not reflect just speed and mental agility. The Control Group in this case consisted of about 1,800 unselected children who were tested for the derivation of the test norms, (op.cit. p.291). The results showed the Mean Subject Quotients for the different ages fell between 130 and 150, showing a remarkable degree of superiority on the part of the Gifted Group over the unselected school children in educational achievement. Even so, the subject quotients were only about four-fifths as superior as the I.Q.'s and Terman commented: "They would doubtless be higher but for the fact that promotions earned had been denied".

In addition to the Subject Achievement Tests, a special General Information Test was devised which was given as a 'power' test, enough time being given for all the pupils to finish (op.cit. p.298). Age norms were derived and gave an approximately straight line from 8 - 15 years. This was extrapolated beyond that age in order to calculate Information Quotients for the able children. The 'Age' norms accordingly beyond fifteen are fictitious units. Terman notes that while this is not a refined statistical procedure it is "a convenient method of comparing high scores when minute exactness is not demanded".

The superiority of the Gifted Group in general information was very great indeed and Terman says, "This holds for both sexes, of all ages, and for each of the four types of information tested". (op.cit. p. 299). A measure of the difference between the levels of the scores of the Gifted Group compared with the Controls is given by the fact that the standard deviation of the scores of the former is two to five times as great as for the latter; and more commonly three to four times as great.

It might be suggested that the difference of 20% between the Mean Level of scores on the Achievement Tests and the Mean Level obtained on the Stanford Binet Intelligence Test might be accounted for by regression to the mean since the intelligence test scores are two standard deviations or more from the mean of the distribution. That this is unlikely to be the explanation of the difference is indicated by the fact that the Mean Information Quotient is about as high as the Mean Intelligence Quotient. Terman explains the higher scoring on the General Information Test by saying, "That the gifted make a showing in general information even better than they make in such subjects as reading, arithmetic, and spelling, is probable due to the fact that the child's stock of information is more dependent upon intellectual initiative and less upon formal school instruction". (op.cit. p.304).

The argument is taken further by the calculation of correlations between school attendance and level of achievement as shown by the Spelling Quotient, Information Quotient, Reading Quotient and Arithmetic Quotient; and similarly between the quotients for the subjects and I.Q. The average correlation between attendance at school and the subject quotients is .066, while between I.Q. and level of attainment it is .362. Terman comments: "Actual length of school attendance seems to play little part in determining accomplishment in comparison with the part played by native endowment". (op.cit. p.304). Nevertheless, the research showed that the level of achievement which the Gifted Group attained was under-estimated according to the class-marks given to the children for their school-work. (op.cit. p.306). It is suggested that the teachers may have under-estimated the children's accomplishments, or else given low marks as a penalty for lack of application to the work set.

As regards Terman's last-mentioned finding, if a proportion of the children were unrecognised by the American teachers of the 1920's this would be in line with more recent work in the States (Barbe, 1964), and is indicated in current studies in this country (Ogilvie, 1973, Hitchfield, 1973) and also the present enquiry.

Returning to Terman's study, a deeper look into the significance of the statistical results of the Achievement Levels and the Intelligence Levels is taken by DeVoss, one of the research team. An examination was made of the gap between the Mean Educational Quotients for the Main Group of 643 Gifted Children of 140 and their Mean I.Q. of about 150, and of the differences between the Standard Score of the Achievement Tests and of the Stanford Binet Test, (op.cit. p.345). There were 77 Differences omitting the total scores and of these, "73 were negative and greater than one standard deviation of such a difference". (op.cit. p.346). From the foregoing he draws the conclusion that these results are in general agreement with the results from the use of educational quotients and that both indicate, "that the intelligence level of the gifted children is higher than their achievement level". (op.cit. p. 346).

Using Standard Scores DeVoss gives 3.98 as the Mean Stanford Binet figure and 2.47 as the Mean Achievement Test figure. He argues, "The score of 2.47 is 62% of the 3.98, which is the difference between the intelligence level of unselected children and the intelligence level of gifted children as expressed in terms of standard scores". (op.cit. p. 347). He then continues, dealing with the difference between the Mean I.Q. and the obtained Educational Quotient which is 40, (i.e., between 100 and 140), which is 80% of the difference between the intelligence level of unselected children and gifted children expressed in terms of quotients. He deduced that on the basis of the EQ the gifted children are achieving only 80% of the excess achievement which their intelligence would warrant, while on the basis of standard scores it is 62%. He believes that the gifted children have an achievement level which is so much below the level of their intelligence that the position represents a challenge to both their parents and teachers.

In his 'Summary and Conclusions' (op.cit. p.362), DeVoss states, "It is definitely established that the intelligence level of the gifted children is higher than the level of their achievement scores. The use of the quotients, the use of standard scores, and the use of the standard errors all agree on this point".

Follow-up Studies of Terman's Group

Subsequent follow-ups of the Gifted Group in 1927-8, 1939-40 and 1950-52, showed that the intellectual superiority of the subjects had been maintained, (Terman & Oden, Vol.V, p.143). Test scores showed that the majority of the Group remained close to the 99th percentile of the 'generality in mental ability'. (Terman & Oden, 1956). This was found to be true of those whose careers were not particularly outstanding and it was noted that the subjects who did not go beyond High School gained the same average score on the Concept Mastery (Intelligence) Test as did the group of candidates for advanced degrees (Ph.D. or M.D.) at a leading university.

Referring to the 1952 follow-up, the report continues, "The test-retest comparisons showed a reliable gain in the 11-to-12-year interval with increases occurring at all educational and occupational levels, in all grades of ability, and at all ages. The data indicate not only do the mentally superior hold their own, but they actually increase in intellectual capacity". (op.cit. p.144). This appears to be an important finding even if added allowance is made for errors of measurement. It appears to strengthen the desirability of studying intellectually gifted children today.

A follow-up examination was made also of the educational attainments and vocational records of the Gifted Group. This shows that 85% of the subjects entered College and almost 70% graduated. The occupations of men and women are considered separately since whether or not a woman chooses to take up a career is affected in addition to those influences impinging on both sexes, by her own attitude to women's role in society, and by the contemporary climate and of opinion on such issues.

The results of the Terman Study show that of the men who were in the top 1% of the school population on intelligence tests as boys, 86% were in the two highest occupational categories 35 years later. Of the remainder, 11% were in small businesses, clerical and skilled occupations, and two and one per cent respectively in farming and semi-skilled work. Among the notable successes of the Group were the 70 men named in the 'American Man of Science'; three had been elected to the 'National Academy of Sciences' and 31 were listed in 'Who's Who'. The report stated, "Between them the gifted men have produced nearly 2,000 scientific and technical papers and articles, and some 60 books and monographs in the sciences, arts, literature and humanities have been published". In addition at least 33 novels have been written and 230 patents granted (op.cit. p.147). Referring to the sum of the work mentioned, the account continues, "they by no means represent all the areas or types of success, for which there is scarcely a line of creditable endeavour in which some member of the Group has not achieved outstanding success".

The picture for the women is rather different. Although some notable achievements - seven women are listed in the 'American Men of Science', two in the 'Directory of American Scholars' and two in 'Who's Who' in America, all before the age of 43, - the bulk of the gifted women are nevertheless reported to be either housewives or to be working in jobs outside the home to relieve the daily monotony of household duties or to earn money in order to contribute to the family income. It is held there is considerable waste of talent among the women although, no doubt, they make a contribution indirectly to the community at large through the rearing of their children and the support they give to their husbands.

The authors of the report have given considerable attention to the eighty or ninety men whose vocational achievement fall considerably short of the level set by the main body. The researchers comment, "Since the less successful subjects do not differ to any extent in intelligence as measured by tests so it is clear that notable achievement calls for more than a high order of intelligence." (op.cit. p.148). One wonders whether such results are the outcome of short-comings in the children's environment either at home or at school, and if so, how this could be improved. The follow-up study of the 150 most, and 150 least successful men after the 1940 enquiry showed that, "personality factors were extremely important determiners of achievement".

Reflecting upon the achievement reported, the authors draw attention to the social setting in which views on the quality and desirability of particular performances must be seen. They believe that relative to the time and place when the study was made, the social ideology had 'an avowed bias in favour of achievement that calls for the use of intelligence'. While the importance of personal happiness is not denied, they have in fact been concerned primarily with vocational accomplishment and in this respect they hold that the record shows that: "The gifted subjects in overwhelming numbers have fulfilled the promise of their youth in their later achievements".

Notwithstanding the foregoing, the gifted group was asked what from their viewpoint constituted life success. Between 40% - 50% of the group gave vocational satisfaction and a sense of achievement as the first of five definitions. From this it appears that the development and fruition of their potentialities is important in the gifted person's own sense of self-fulfilment as well as being of benefit to Society at large.

Adult Status of High IQ Children

The retention of high intelligence, as measured by the tests, has been shown to be maintained in adulthood by a number of researchers (Longe & Hollingworth, 1936, p.216). These authors report on a relationship between a childhood test score of 140 or above on the Stanford-Binet Scale and the "best fourth of all students graduation from American colleges". Their enquiry found that "outstanding original intellectual achievement might be expected of those few children scoring an IQ of 180 or higher". Of the five children covered by their survey who gained IQs of over 180, each as a top-rank person was found to be noteworthy among contemporaries, since, "Before the age of 22 in all cases, one had prosecuted research in history; one in mathematics; one in chess. Two had become established in learned professions. One stood high in national ranking for chess. A long list of medals and prizes had been won by them". (op.cit. p.225).

However, one may comment on the above that although, given two groups of children of equal numbers, the probability of outstanding achievement by those scoring the highest IQs in childhood is greatest, this does not preclude success of similar standing being achieved by those not so scoring during their juvenility.

Methods of Identifying Gifted Children

An important study of the means whereby intellectually gifted children may be identified has been undertaken by Pegnato and Birch, (1959, reprinted Barbe & Renzulli, ed. 1976). The venue was a large school situated in a favoured neighbourhood, from the socio-economic standpoint, of Pittsburgh. The project concerned covered the total roll of 1,400 children in the Junior High School and had as its main objective the investigation of the relative efficiencies of seven different methods of identifying 'gifted' children. A Stanford Binet Intelligence Quotient of 136 or higher was taken as the definition of mental giftedness in this enquiry. The seven methods used to identify such children were:-

(i) Nomination by the teacher.

(ii) Honour Roll listing; gaining an all subject average of 'B' or higher on a five point rating scale of relative level of achievement.

(iii) Teachers of music, art, etc. were asked to nominate children of exceptional talent.

(iv) Children elected by their peers on to the 'Student Council'.

(v) Teachers of arithmetic and mathematics were asked to nominate children outstanding in these subjects.

(vi) Group IQ tests scores were available for all the children at the school in the school records. An IQ of 115 was taken as the cut-off point and children gaining this score or above were referred for individual examination.

(vii) Children in the school were given as a matter of course, achievement tests in all the chief subjects and those whom the school records showed had scored highly, were selected for inclusion in the list of possibly 'gifted' children.

The various screening methods resulted in 781 names being recommended for inclusion as 'gifted', more than half the total school population. Each of these pupils were given individual psychological examinations and their Stanford Binet IQs were then tabulated so that the effectiveness and the efficiency of the various screening methods could be evaluated. The findings showed the most effective method to be the Group IQ test, with a cut-off at IQ 115 since 92.3% of the 'gifted' were located by this means. The next most efficient method was the Group Achievement Test which identified 79.2%, followed by the Honour Roll which gave 73.6%. Well down on the list, were teacher's judgments which identified only 45.1% of the 'gifted' children, that is, less than half of them. Pegnato and Birch comment, "Teachers do not locate 'gifted' children effectively or efficiently enough to place much reliance on them for screening" and further on, "Not only were more than half of the gifted missing, but a breakdown of those children referred as gifted by the teachers revealed that almost a third (31.4%) of those chosen by the teachers were not in the gifted or superior range, (italics), but in the average intelligence range on the Binet". (op.cit. p. 263).

In another study (Martinson & Lessinger, 1960) of kindergarten children, while the researchers agree with the use of a group test as a screening device, they draw attention to the fact that should the cut-off point be the more usual 125, then 82 of the 332 children identified as having a score of 130 or more on the Stanford Binet scale would have been missed.

A less known study (Barbe, 1964) aimed at identifying a group of intellectually highly 'gifted' elementary school children alongside a group of moderately gifted children. The methodology involved the nomination by psychology interns of pupils in Grades 3 to 6 (ages 9 to 12 years) thought to be potentially capable. The pupils were given a battery of tests which included the Stanford Binet Intelligence Test and those who scored an IQ between 120 to 130 were put into the moderately gifted group, while those who scored 148 and over were put into the second, the highly gifted group, so forming 65 matched pairs of children. From the second group the authors draw a "Portrait of the Highly Gifted Child" which includes, among other things, not being "singled out by his teacher for superlative rating". (op.cit. p.77). The researchers sought information with regard to their environment for which purpose the teacher of each classroom in which one of the subjects was enrolled was asked to identify in a socio-metric instrument the children best described by each of the following ten statements;-

Who is the most popular pupil in your class?
Who has the wildest ideas?
Who is the smartest?
Which pupil do you like best?
Who is the most talented?
Who is the best leader?
Who is the most imaginative?
Who has the most academic potential?
Who is the most intelligent?
Who is the funniest?

As a result of examining this data, the researchers comment, "Note-worthy is the fact that 25% of the highly gifted group was not listed on one of the ten categories. Remembering that each of these children had received IQ scores of 148 or above, it seems difficult to believe that so many of them could be left off the rating as the most intelligent or having most academic potential, Table XXIV (op.cit. p. 58) shows the teachers as having nominated less than half of those in the highly gifted group.

The identification of some 'gifted' children is not difficult. The problems arise if it is desired to identify as far as possible, all of them. Hildreth (1966) believes that teachers are better judges of present achievement than of academic potential, and she indicates how long standing has been the problem of identification when she refers to the work of Dr. Whipply in 1919 who gave mental tests to children nominated as 'gifted' by their teachers. Hildreth continues, (Op.cit. p.151) "In Dr. Whipple's control group of twenty "average children" six were found to have IQs higher than the median of the special class group, but were definitely characterised as "average" in school work". Dr. Whipple discovered that teachers were more accurate in spotting the dull than the bright, because the dull were so obviously unable to learn as fast as the others and concluded that identification of the intellectually able should be on the basis of performance on mental tests. Hildreth continues referring to Dr. Whipple's associate, "Dr. Coy reported that half of the brightest boys and girls selected for special classes set up in Columbus, Ohio, would have been missed if she had depended only upon teacher's judgements in selecting the children". (op.cit. p.152).

Hildreth believes that teacher's judgments rests largely on impressions and that their ratings of aptitudes and achievements are, "contaminated by non-intellectual traits and behaviour symptoms".

She feels that the teacher is likely to pick out as superior, "the attractive, agreeable, lively, or glib student and to pass over the non-verbal child or the young rascal who gets into difficulties over his cleverness". (op.cit. p.153). A further tendency is for teachers to rate a child's behaviour and achievements in relation to the average of his class and this tends to be inaccurate if the child's age is not taken into account, while the yardstick she is likely to use will be the children in her own class or school, rather than the average level of attainment of children of that age in the community at large.

Regarding identification, Hildreth concludes, "Common procedure for selecting exceptional children of any type, - bright, dull speech defective, the physically handicapped and others, is to request teachers to list pupils in these categories and to refer the cases for further diagnostic study." (op.cit. p.149). This is roughly the procedure adopted in this country too. It is probably, however, an oversimplification of the position to assume that the two ends of the intelligence continuum are the antithesis of each other and that apart from the fact that in the one case the children are dull and in the other the children are very bright, there is no qualitative reason for using a different approach in their identification.

One point which might well be considered is the fact that the dull children, almost by definition, are not able to misrepresent themselves to the adult world as regards their aptitudes since they will not have the capacity to do so; on the other hand, the highly intelligent child may find it suits his/her own ends not to appear too bright, not to appear too able, since this may be a means of getting out of some particular task that he/she does not wish to undertake, or be a means of staying with his/her friends in a particular class or school, or for any other reason the child does not want to 'let on' that he is able of achieving some end. The essential point is that the able child has the ability to conceal things from the adult world, or to present them in some particular light of his own choosing. This capability is a product of his/her intelligence - the fact that a child is clever is no reason at all for assuming that he will use his cleverness in accord with adult wishes whether they be those of the school, his/her parents, or anyone else. In this way then, the highly able child differs fundamentally from the dull child and it is perhaps one of the reasons why, as mentioned above in connection with Whipple's work, it is easier to identify the dull child than the bright one.

For some years it has been practice in a number of the States in America to promote, or to provide for 'gifted' children in some particular manner. To assist teachers in identifying candidates for such special treatment Hildreth quotes Laycock (1957) who recommended the following plan for the location of 'gifted' children:-

"1) Observation by the teacher who is guided by a twenty item check-list.
2) Results of standard achievement tests.
3) School records.
4) Results of standard tests of mental ability.
5) Individual intelligence tests.
6) Tests of specialised abilities.
7) Informal tests and procedures, results of memory games and contests.
8) Information gained from conferences with parents and other informants."

The view is expressed by Hildreth that, "For the purpose of identifying all high potential students, comprehensive scholastic aptitude and achievement tests should be administered on a uniform basis to everyone". (op.cit. p.151). The objections to such blanket treatment of the school population includes the obvious one of expense and administrative machinery. Further, in the United Kingdom it would be likely to run against the prevailing philosophy of our times which appears to consider classification of children by ability as undesirable, except perhaps in the case of the slow-learners. Yet it seems, if we are not to waste talent, that some method of seeking out ability should be devised beyond that of teacher identification. There is a significant difference in the problem of identification between the two ends of the ability scale. If a child is performing in scholastic subjects below the average for his chronological age, then the fact is obvious. The problems are restricted to determining what is to be considered abnormal slowness, and if this is thought to have been established, what corrective measures shall be taken. The less able cannot in the nature of things deceive the adult world, except perhaps in a limited manner. If, in fact, a slow-learner does so, this fact alone is an indication that the cognitive ability of the child is not as restricted as at first believed. However, in the case of the highly-able child, it is in just those cases where the exceptional ability is not obvious through a high level of school-work that identification becomes important.

Another aspect of the distinctive needs of the intellectually gifted child is discussed by O'Shea (1975, ed. Barbe & Renzulli). In her paper she reaffirms Lippitt's (1940) assumption that "the power fields of friends strengthen each other" and proceeds to discuss the relevance of mental age in this context. O'Shea contrasts the seven- and eleven-year mental age levels as regards how much more material is "organised in one grasp of the situation at the eleven-year level" (op.cit. p.224). Referring to Mann's work (1957) she reports that he studied 67 intellectually gifted children from a population of 1,000 who were taken for half of each day into a special workshop, the other half day being spent with their chronological age homeroom group.

Using a sociometric technique each child was asked to choose whom he would want to have with him at a school party, to help him catch up with school-work if he had been absent or whom he would like to have on his side in a team. Mann also enquired who would "least" be wanted under these circumstances. O'Shea reports Mann as finding that both the positive choices and the rejections were overwhelmingly for the other work-shop children. She comments, "In other words, there seems to be revealed here a perfectly clear-cut difference in the lack of awareness of, and undoubtedly the lack of interest in, the lower mental-age children (of the same chronological age) and a greatly heightened awareness of and interest in the children of the same high mental ages". (op.cit. p.227).

The importance of possible implications of Mann's work is expressed by O'Shea in her concluding remarks. She comments, assuming close friendship to be desirable - that it increases the socialisation of the individual, makes life more satisfying, maintains general mental health - "then it is urgent that arrangements be made for intellectually gifted children (in school, on playgrounds, in community activities) which will offer them appropriate social contacts to enable them to build friendships." O'Shea believes that, when a gifted child is bound into the company of those of lower mental age who are less developed personalities, he is in effect an isolated individual who suffers "malnutritions", in the "rewarding experience of close friendship", (op.cit. p.228).

It appears then that there may be psychological as well as educational differences between intellectually gifted and the generality of children.

BRITISH WORK

Burt's London and Other Surveys

There has been a long tradition of interest in the selection, education, and general development of children of high potential in this country dating back to selection for secondary education at the beginning of the century. Instruments were developed for the identification of those children who it was thought required special educational provisions, whether at the lower or the upper end of the intelligence distribution.

Major studies were undertaken by Sir Cyril Burt and his team, commen[illegible], with the study of 3,500 London School children during the First World War, (see p.5).

The 'supernormal' children who were identified in the London Surveys were divided into two groups - those scoring IQs between 115 - 130 and those scoring over 130. For these the following figures were obtained.

TABLE 3/1 EXTRACT FROM BURT'S LONDON SURVEY

IQ Scores	Intelligence Quotients	Educational Quotients	Progress Quotients
115-130	123	111	109
Over 130	135	121	118

(Figures from Yearbook of Education, 1962, p.32).

It was decided in 1921 to continue to study the brightest children. The highly-intelligence pupils, it was noted at the time, tended to be, "above average in all else, health, height, emotional stability, scholastic adjustment, as well as scholastic achievement". In these findings the London Survey is in agreement with those made for the Terman Group in California. From case histories of the highly intelligent children (Yr.Bk.of Ed. 1962, p.37) it was seen that most of them had had an accelerated development very early in their school career, and often before they entered school. The London inquiry showed the highly able child to differ from the rest in the amount of time spent on reading, on hobbies such as Meccano sets and toy theatres and the more limited amount of time spent at the cinema. As regards leisure activities, they were more mature in their choice and favoured games such as chess and cards which required thought. Burt continued, "they are by no means solitary or unsociable. On an average they spend two-and-a-half hours daily with other youngsters out of school hours". (op.cit. p.38). Again, these findings seem very much in line with those arrived at by Terman.

Nevertheless, adjustment problems were noted among children drawn from the 'middle' or 'lower' classes, maladjustment was more common, while with the poorer sections the difficulties increased because the bright child was often more intelligent than his parents which resulted in conflicts at home. (op.cit. p.39). No adjustment difficulties were noted for off-spring of the higher professional sector who were for the most part, in that period, educated at 'Public Schools'.

Children scoring IQ 130 and over were classified by Burt into two sub-groups, the 'moderately supernormal' taking in Galton's grades 'D' and 'E', and the 'highly supernormal' scoring 150 and over, Galton's grades 'F' and 'G'. (op.cit. p.42). Of the second group Burt judged the children might be as much ahead of the majority of the 'gifted' children in the first group, as those in the range 130-150 IQ were ahead of average children. Although the group scoring IQ above 150 were so few in number that generalisations were dubious, nevertheless Burt considered that, "Within this group maladjustment tends to increase in severity and frequency with the increase in the intellectual disparity". Since children in the category with IQs above 150 were so rare, he believed it might be that their particular difficulties were not understood by either their teachers or their parents. Burt recounted that, "Among my own cases one type of difficulty appeared again and again as a cause of emotional disturbance - a difficulty rarely suspected by the parents and commonly concealed by the child himself, - namely the problems of human life as such, particularly the enigmas of birth and death". (op.cit. p.42, footnote 48). He continued, explaining that, "highly intelligent youngsters may begin to worry about metaphysical and philosophical questions" at an early age and that, "the resultant moral and religious conflicts can lead to a nervous breakdown".

Dealing with the personality characteristics that he has observed among these very highly able children, he says that their abilities tended to be all round, at least in the early years. "They show a much greater fund of common-sense, originality, and intellectual curiousity than others of their own age. They are in nearly every respect more mature; they work harder; they are more conscientious, scrupulous and truthful; they readily take the lead, and, unless disheartened by repeated frustration, display greater self-confidence and finer social qualities. The defects that a few occasionally exhibit are usually traceable to the special conditions under which they have developed, and especially to the fact that their exceptional abilities have been overlooked, or their needs inadequately met". (op.cit. p.43 & 44).

This outline or the main characteristics and personality traits of the highly gifted child, supports the general findings of Terman's study.

Turning to the children whose mental development appears to undergo a set-back, Burt says that, "nearly 12% of the failures encountered in our enquiries appear to be due to unforeseen developmental changes" traceable as often to external as internal causes. (op.cit. p.48). 32% of the cases arose from personality weaknesses and, "in particular from the child's attitude towards school. In the teachers' reports the commonest complaint is that the child is lacking in the 'will to work'... In many cases the school itself is largely to blame. The deep and lasting influence exercised by an enthusiastic and scholarly teacher is constantly mentioned in the autobiographical..... comments of pupils who have effectively developed their potential gifts." (op.cit. p.49 & 50). Burt pointed also to the importance of the attitude of the family which was largely the determiner of the child's attitude.

Finally, Burt stressed the importance of "identifying those who are potentially gifted at the earliest possible age" so that the curriculum and training they receive at school should be appropriate, "to their unusual capacities". (op.cit. p.57).

Turning to a more recent period, Burt found that among the supernormal in Primary Schools, "the commonest cause of maladjustment springs from the combination of intellectual superiority with a physical, emotional and social development that was relatively immature". (op.cit. p. 39 & 40). He drew attention to the central problem: that if the highly able child was promoted to a class in accord with his intellectual development he was obliged to mix with children older and bigger than himself; while if kept with children of his own age and his exceptional abilities were not recognised, it might be that his mind "will run privately far ahead of his companions. In grasping new ideas, learning new facts, solving new problems, he will be nearly twice as quick. He is compelled to mark time while the rest catch up; and as a result soon becomes bored, restless or lazy. The others in their turn will resent his superiority, and perhaps twit him for being the teachers' pet. Thus, in whatever class he is placed, he is unable to join with his fellows on equal terms and is thrown back upon himself". Burt's remarks here dove-tail with O'Shea's findings (p.40), the two authorities approaching the gifted child's social problems from their own viewpoints.

Nevertheless, it appears that the percentage of marked maladjustment and delinquency is lower than for the controls, the actual values Burt gives being 0.8% and 0.2% as compared with the more commonly found 2.6% and 1.2% respectively. However, some additional highly-able children may be anti-social yet be skilful enough to avoid revealing the fact. The 'gifted' group, too, have been found to participate more actively in clubs and debating societies, frequently holding office. In the foregoing characteristics, as in others mentioned previously (p.24), the British findings appear to be generally in line with the American ones. Finally Burt noted, referring to this group, that, "in addition they were reported as far more regular in their attendance at church, chapel, Sunday School or Bible classes". (op.cit. p.41).

Regarding the study of a representative sample of 782 children selected in order to form a group with an approximately normal intelligence distribution, Burt reported upon his follow-up findings (1954, Studies in Ed., No.6). The children were originally tested between the ages of ten and twelve and were independently re-assessed after the age of eighteen. The values obtained showed that of the children of high intelligence (over 122.5 IQ), roughly two-thirds had a similar assessment on the second occasion approximately ten years after the first test, and the remaining third were assessed as only 'moderately high', i.e., they scored between 107.5 and 122.5. On the other hand, among the children of very low intelligence, only one in six rose to the next higher category. There is here, then some evidence of a degree of stability of IQ over a time interval of a number of years. This finding supports, although less strongly, that made for Terman's gifted group (see Ch. 2, p.10).

Another aspect of the subject which is important is the absolute numbers of intellectually highly able children that are likely to be found in the total population as well as their geographical and social distribution. This matter received consideration in the course of an examination of the extent to which the distribution of intelligence follows a Gaussian curve.

Between the Ward a number of surveys were made in connection both of re-standardisation of the Terman-Merrill Intelligence Scale (Stanford-Binet) and the eleven-plus selection procedures for secondary education adopted in this country. These included an examination of the abilities of 1,600 pupils aged 9½ - 10½ years in the Oxford area and another involving eight times as many children in the Liverpool district. A third study was directed towards boys aged 11 - 16 years in secondary schools.

Drawing upon the above-mentioned surveys, Burt states that "A detailed analysis of test results obtained from a large sample of English children (4,665 in all) was supplemented by a study of the meagre data already available", (1963, Br. Jnl. of Stat.Psy., Vol. XVI, Pt. 2, p.189). Burt finds that the distribution of differences in general intelligence does not conform to a normal curve, although for relatively small samples from which individuals scoring below 60 and over 150 had been excluded, 'The normal curve would provide a very plausible fit", (op.cit. p.180). However, when the larger sample became available as a result of the investigations for the 'New Revised Stanford Binet Tests', the distribution showed a downward asymmetry with elongated tails and Burt observed, "It is plainly skewed with a prolonged lower tail. Of the entire group more than 10% have IQs under 80; only 7.7% have IQs over 120". (op.cit. p.178). When a theoretical distribution is calculated on the basis of the normal curve and the values are compared with those resulting from the survey, Burt stated that the observed figures result in too sharp a peak and the tails were far too widely and unequally spread out for the distribution to be typically normal. He concluded, (op.cit. p.189) that the suspected larger number of 'subnormal' individuals in the population had been verified but that, in addition, "the number of 'supernormal' individuals also shows a similar though slightly smaller excess". Burt suggested that intelligence follows the pattern of Pearson's Type IV distribution and he estimated that the number with IQs of over 160 was more than ten times the number to be expected from a normal distribution. His calculated and other values are set out in a table from which Table 3/2 has been drawn.

TABLE 3/2

Observed and Theoretical Distributions of Children
Scoring over IQ 140
(Drawn from Burt, 1963, p.178)
(expressed as percentages)

IQ	Normal	Type IV
140-145	0.26	0.28
145-150	0.10	0.13
150-155	0.03	0.06
155-160	0.01	0.04
Above 160	-	0.04

Burt also extrapolated from the observed and theoretical IQ distributions the proportional number of individuals lying outside of a borderline of IQ 175 and deduced that, "Instead of the proportion of those with IQs of 175 or over being only three or four per million it rises to nearly 77 per million." (op.cit. p.182). Taking the estimated number of children in the country as being approximately eight million this would mean between 500 and 600 children with IQs of 175 and over. He commented that the exact determination of the number of 'supernormal' children has received less consideration than has been given to the 'subnormal' group. (op.cit. p.186). He referred to contemporary discussions about the 'national pool of ability', and drew attention to the fact that most of this had been concerned with ability levels of about 110 and 130 IQ. As regards the 'exceptionally gifted', he says, "They form a group who constitute one of the nation's most valuable assets and whose special educational requirements have hitherto been grossly neglected." He drew an analogy between the category of children whose IQs average 170 as against the average grammar school level of about 122, and the gap which existed between such grammar school children and the educationally 'subnormal' whose average IQ would have been about 77. He concluded, "Such highly gifted individuals must therefore be as much out of place in the ordinary grammar school as the grammar school pupils would be in a class of dull and backward youngsters; and this is fully borne out by evidence gathered from such youngsters while still at school, or later on when, as adults, they have reported or recorded their school experiences".

In support of his statistical calculations and deductions Burt gave the following evidence:- (op.cit. p.187),

1. A study in Oxford of 1,600 children aged 9½ - 10½ yielded six with IQs of 175 or above, nearly 0.4%. The high figure is explained on account of the large proportion of children from University dons, etc.

2. While a group nearly eight times as large in Liverpool's elementary schools did not yield a single child in this category, such children were located in other schools in the area and the proportion of the total was estimated as just under 30 per million (= 0.003%).

3. In the London Surveys children with IQs of 130 and 145 respectively were found in the proportions 3.24% and 0.45%, instead of 2.27% and 0.13% which would be anticipated with a normal distribution. This was in spite of the fact that few of the children from professional parents were included.

4. In the study of boys of secondary age for the Board of Education, 23 were located with IQs of 175 or over, mainly in 'Headmasters' Conference Schools'.

Apart from giving actual evidence of the greater proportion of 'very highly able' children calculated to be present in the population, the studies under 1) and 2) above pointed to great unevenness in the distribution of intellectual ability, supporting on a national scale the differences in geographical spread of the highly able first found in the London Surveys between 1915 - 1920. The surveys above also underlined once more the disproportionate numbers of the very highly intellectually able to be found in the different social classes.

In this 'Summary and Conclusions' on this paper, Burt drew attention to the practical importance of his findings, and added, "Thus the proportion of those with IQs over 160 proves to be more than twelve times higher than that deduced from the normal curve, and the proportion of those with IQs over 175, instead of being only about three or four per million, (assumed in several official or semi-official statements), must be at least 70 per million, probably more". (op.cit. p.189).

If Burt's assessment of frequency of intellectually gifted children in the United Kingdom populated is correct, then the importance of research into their geographical and social distribution, their other characteristics and their educational and psychological needs is increased correspondingly.

The Brentwood Experiment

In this study (Bridges, 1969), two successive groups of children were selected from local primary schools as being exceptionally intellectually able. The first group of twelve boys and eight girls were chosen by the head teachers and were children who had made sure of grammar school places by scoring highly on the secondary selection tests. The second group consisted of thirty-eight eight and nine year-olds who were nominated first by the schools and subsequently tested by a Local Authority psychologist on the Stanford-Binet Intelligence Test. It appears that the resulting score was taken as the chief indicator of their potential ability.

Bridges (p.24 & 25) suggest that the scholastic capabilities of highly able children may pass unrecognised as such. Their performance at home and at school may be above the average expected from children of their chronological age, and scholastic and social environment, while not approaching their potential. As a result, while they are seen as bright children, they are not seen as outstandingly able.

As regards the first group of pupils, Bridges (op.cit. p.5). recounts that there was a general feeling of disappointment at the College with the standard of work produced by the children, bearing in mind the high scores they had obtained on the intelligence and other tests. This was attributed to the level of work expected from them by their teachers, and possibly also their parents, which led the children to have relatively low aspirations. Since the pupils had found it easy to maintain a good position in class which had met with approval both from their teachers and their parents, they had been satisfied to coast along for years. The College attempted to alter this attitude to school work but unfortunately the period of three or four months available was too short.

The second count on which the above children's work was criticised was their tendency to impatience. This characteristic showed itself, in particular, with their disinclination to write up a science experiment once the practical work had been actually carried out. To remedy this attitude the Brentwood team decided they would "try to stress the necessity for patience and accurate work". (op.cit. p. 6).

With the second group consisting of thirty-eight, eight and nine year-old pupils, Bridges reports that the most frequent of the problems that arose was that the children were bored unless they were highly stimulated and they tended also to take things too easily. (op.cit. p.9). Normally, the schools had considered the children's classwork to be satisfactory. Yet in timed tests of reading and vocabulary, although the work done was almost faultless, the children did not finish the tests. (op.cit. p.11). Another indicator of the low key in which they were operating was the slow manner in which they put their hands up to answer questions - although they would still have been the first in the classes from which they were drawn when there were no others of comparable ability. This leisureliness was lacking where several children of high ability were drawn from the same school class. The slow ones speeded up too, when they found themselves among their intellectual peers. Two or three went through a rather unhappy period during this process of general smartening up but ultimately the pace for the whole group was much the same. (p.12).

A similar position was found in respect of mathematics. Some of the children were accustomed to working at only a moderate pace so that when a timed Mathematical Insight Test was given their scores were disappointing, although most of what they had done, had been correct (p.12). Even so, during the course of a few weeks at the College their standard improved so much that the student-teachers responsible for taking the maths. were unable to give immediate answers to some of their questions and had to promise to do so the following week. Initial slowness did not apply to all the children. Some worked very fast indeed, but in a slap-dash way and in tests made many errors they could have avoided or corrected had they worked with greater care. Bridges notes that the same impatience was to be seen with these latter children as was observed with some of the first group of twenty.

Commenting upon the Brentwood experience with children of exceptional ability, Bridges advocates that the work they should be given should be more advanced than that which they normally do in school; at the same time it should not be merely an anticipation of later work since this would result in boredom at a later stage so nullifying any benefit which might have resulted. Likewise, hard work of the same type as they are already doing in school would be unsatisfactory as this would soon lead to boredom in the present. (p.14).

Under Achievement

Bridges deals with this aspect of the exceptionally able in some detail. First, he refers to the manner in which the Brentwood children were selected, that is by nomination of the head teacher. Considering the basis of such choices, he believes the heads concerned chose the children on the basis of any test results they happened to have, and on their own personal knowledge of the children and their home background.

While these seem useful criteria for identification of outstanding children, there remains the possibility of overlooking children who are under-achievers. (p.24).

Next he considers the acceptability of the concept of 'under-achievement'. While he appreciates the different definitions which have been given to the term, he points out that there are few teachers who would deny that there are some children who do not make full use of their powers in school and gives as an example, the so-called lazy ones.

Referring to the Brentwood findings, the writer says that under-achievement can occur where a bright child has powers much in excess of what he is called up to use in school, so that while he may be first in his class, from the viewpoint of his intellectual gifts, he may be under-achieving. He continues, "In such cases, the measure of under-achievement is obscured by the general satisfaction of a relatively good achievement". (p.24).

In some cases under-achievement may go unrecognised and the child may drift along quite satisfactorily, but still, only making partial use of his ability. Standardised tests may help to show up such under-achievement although if the child is one of the most exceptionally able there are no available means for the purpose. Accordingly, Bridges concludes the production of appropriate tests is required. Nevertheless, some children may slip through unrecognised since even the I.Q. test may fail to show a clever child's potential if he chooses to be unco-operative. (p.25).

Next, the possible causes of under-achievement are considered. The first, relates to standards. It is thought that teachers tend to be too easily satisfied. If work is at a good level they do not ask, 'Should this pupil be doing still better?" For their part, parents tend to be satisfied if the terminal report is good, but do not ask themselves whether it is good enough. Likewise, the children themselves become too easily satisfied with their work being pleased if the mark they receive for a current piece of work is not less than that for a previous one, (p.25). There are also, Bridges believes, cases where children tend to play down their abilities in order to conform to the prevailing standard of the classroom group. He refers to a boy who hinted that he and his class-mates worked more leisurely than necessary since they did not wish to draw attention to the slowness of the other children, (p.25).

In Chapter 3, Bridges returns to the question as to whether or not adult demands upon the exceptionally able pupils are high enough. He suggests that the required levels of output are too low for the majority of the child population and emphasises that if this question should be asked generally, then it is still more urgent that we ask whether our level of aspiration for gifted children is not absymally and perhaps desastrously low. He continues, "This is the outstanding reason for gifted children not receiving the help which they need, to which they are entitled, and for which they will give a very substantial return". (p.26).

The chief expression of the under-achievement was what came to be known at Brentwood College as the 'stint'. The children showed that they had been accustomed previously to responding to a certain level of expectation and accordingly they anticipated that the Brentwood expectations would be the same. Bridges reports that, when asked to write, the pupils would enquire how many pages, or occasionally lines, were required, and they were experts at providing the quantity suggested. Quality was treated similarly, and Bridges continues, "some of the children were quite taken aback when we showed dissatisfaction with the output they were accustomed to hand in." (p.26). He expresses the belief that if teachers become aware that they are partly responsible for the children's limited approach, then they may take steps to prevent its development.

Bridges found a second manifestation of under-achievement to be boredom but anticipated this would not always be obvious to the class-teacher. The members of the College team discovered, in discussing with the pupils, that most of them were bored for some of the time but the children, "would not always have used that particular form of expression". Instead some said that most of the work was too easy, "but they did not necessarily show any great concern".

The College team gave consideration to two "needs" of gifted children and it was felt these should not be overlooked in connection with raising the children's standards of work. The first requirement was to change the pupils' attitude to their studies and discussions with the children took place in order to break down their "stint" approach. The second consideration was that adequate stimulation from adults should be provided. In reply to the suggestion sometimes made that gifted children only required a good library, Bridges states that first-class library facilities were provided at the College but the children failed to take full advantage of them. He concludes that opportunity for self-stimulation is not sufficient by itself, commenting, referring to the highly able group of pupils involved, "The work they produced was competent enough, but was disappointing by the standards we had hoped they would achieve. On the other hand, when an assignment was set and an experienced teacher worked with the children, standards of achievement rose perceptibly". (p.29). The College team devised their own methods whereby they were able to evaluate the improvement in the children's performances as a result of participating in the Brentwood experiment.

Finally, one other point Bridges makes should be mentioned; gifted pupils are children, and once released from the class-room play ball and chase each other just like any other children. (p.32).

In general, Bridges' findings are in line with those in other studies. However, the Brentwood study has made a valuable contribution to knowledge of the educational problem in this country since it deals with the contemporary circumstances of children with high IQs in British primary schools. The work is particularly valuable in highlighting the existence of the 'stint' approach and in revealing the need for appropriate teaching provision for intellectually gifted pupils.

Maladjusted Able Children

Another recent work was that undertaken by Kellner Pringle for the National Children's Bureau (1970). This study examines 103 intellectually able children, who were also maladjusted. The first sixteen cases are well documented, information being given as regards chronological age, mental age, I.Q. on the Stanford-Binet Scale, Reading Age, Spelling Age, Arithmetic Age, number of siblings, outstanding personality traits, occupation of both mother and father and parental attitude to the child. The sample was made up of 75 boys and 28 girls whose mean I.Q. was 133.8, with a range from 120 to 208. (p.72 & p.146). Boys obtained the two highest IQ scores of 181 and 208.

Pringle reports that she found a considerable degree of educational backwardness which was unexpected. It had been thought that very intelligent children would at least have reached the average scholastic standards obtained by the majority of their contemporaries. The subjects were given attainment tests in reading, spelling and arithmetic and Pringle recounts, (p.75), that, "Between a quarter to a half of the children obtained scores which were one or two years below their actual age; and the number whose scores were two years or more below their chronological age was still sizeable (some 25 per cent), except for arithmetic". Her tables 8, 9 and 10 show that while the pupils' mean Reading Age was three months above their mean Chronological Age, the mean Arithmetic Age was one month below, and the mean Spelling Age was only 9 yrs. 2 m. against a mean Chronological Age of 10 yr. 4m. Pringle continues, "When comparisons are made between educational and mental age levels, the standard of the great majority was found to be two or more years below the children's mental capacity. Thus the extent and degree of under-functioning or under-achievement was very considerable. (Table 11)".

In Burt's introduction to Pringle's study, (p.XI), he says, referring to the identification of 'under-achievers', "The correct procedure is to take, not the ratio, but the difference between the child's standard measures for intelligence and for attainment, or (what is virtually the same if the tests have been suitably standardised) between his mental age and his educational age (cf Tables I-IV in this volume, p.p. 8-11)". The tables show a difference between mean Mental Age and mean Reading Age of 3 years 1 month; between mean Mental Age and Arithmetic Age of 3 yrs. 7 m.; and between mean Mental Age and Spelling Age of 3 yrs. 5m.

Returning to the main text, it is suggested that a partial explanation of why such children are under-estimated is because they do not do themselves justice on group intelligence tests. Pringle recounts that for 52 children where average group intelligence test quotients were available, the group test IQs ranged from 115 to 135 although for the same pupils individual test IQs ranged from 125 to 150 (p.75). She believes the reasons for the lower scores on the former are due to the similarity between the group intelligence tests and the scholastic tests, and because there is an absence of the encouragement and praise which forms an integral part of the individual test procedures.

Under-Achievement

In Chapter 11 Pringle considers maladjustment and under-achievement. She states, (p.105), "While backwardness relates educational attainments to chronological age, and hence to the level of work reached by the majority of a child's contemporaries, under-achievement of under-functioning relates it, solely to the capacity of, the individual pupil. In the one case a group norm serves as a yardstick, in the other it is the learning ability of the particular child in question". She continues, stating that the needs of the slow-learning and educationally backward children are now fairly well understood since they have received considerable attention in recent years. She goes on to say that, "This is by no means the case with regard to under-achievement. Far too often it is still thought - by parents and even by teachers - that if a child does badly at school he must be either stupid or lazy..... That intellectually able and very able children may in their school-work not reach the level of their own potential or fail to achieve even the level of the majority of their own age group, is an idea which has been particularly slow in gaining acceptance". (p.105). At the same time, she points out that exceptionally able children cannot be expected to function at a level commensurate with their mental age as materials designed for chronologically older children would not be suitable.

Next Pringle turns to the causes of under-achievement which she considers to be complex. She argues that, since there is a close link between emotion and learning, and as the basis of all learning is laid in the home during the earliest years, the chances are that the roots of under-achievement are to be found there (p.106); but later on too at school, the child may or not receive satisfaction of his particular needs. Bearing in mind the closeness of the connection between emotion and learning, Pringle considers that whatever the level of their ability, children need, "the stimulus of success as well as the discipline of failure without being overwhelmed by guilt or anxiety". (p. 107).

The report upholds the view that some able children remain unidentified throughout their school career (p.115), giving as contributory reasons, the inadequacy of existing tests, the cost of providing the necessary facilities, and the number of highly skilled staff who would be required for their identification. There is, too, the present climate of opinion, and the author reports an American view (Pegnato, 1959) that the meritocracy, towards which we are moving, "tends to be opposed to making exceptional educational provision for exceptional individuals". (p. 116).

Pringle notes that, "There has been a tendency for educational administrators, as well as teachers themselves, to concentrate special attention (and special provisions) on children of limited mental ability. The Often unstated assumption is that those of superior or high ability are capable of developing and functioning adequately without requiring any special attention". (p.116). Later on she gives evidence to support her position. She says that while the direct evidence of under-achievement among highly able children derives largely from comparatively small-scale enquiries, it is nevertheless clear that it represents, "only the top of an ice-berg". (p.122). The indirect evidence, she says, is provided by such sources as, a) the record of immigrant groups in a new country, which offers them greater economic opportunity; b) the study of foster children brought up in intellectually superior homes to those which their biological parents would have provided for them; c) undeveloped talent among girls who represent about two-thirds of the pupils leaving school early in spite of having the ability to proceed further; d) the emergence of persons with specific talent when the cultural environment is favourable, as for example musicians from among Italian families, athletes from many parts of the world for the Olympic Games, and scientists in Northern Europe.

Returning to the situation specifically in the United Kingdom, Pringle says that in spite of the fact that there have been local, regional and other surveys from time to time, the question of under-achievement has not been tackled. She believes that, "studies are needed of those able children who confound prediction: those who despite an unfavourable home background or uninspiring teaching do well during their school career, as well as those who subsequently excel themselves even though their scholastic performance has been consistently undistinguished". (p.126). Pringle appreciates the financial cost of the comprehensive type of enquiry which is required into under-achievement among very able children but believes that the cost cannot really be measured in monetary terms. In any case, she

she considers that the long-term benefits would far outweigh the costs of such a project.

Reference is made by Pringle to "Recent research which has shown not only that the achievement of those pupils of whom little is expected becomes progressively less, but also that those from whom the teacher is led to expect more do, in fact, produce better work". (p.136). She adds that, "There is much evidence in the literature of psychology of the existence of a sizeable degree of under-development and under-utilisation of human ability", and that under the present position, "children who fail to be identified as possessing good ability, often will not receive appropriate educational stimulation and opportunity". She remarks that "Such under-achievement occurs more frequently among children who have emotional problems, who come from low income, and probably also from immigrant, families". In addition, she refers, too, to the under-utilisation of abilities among girls (p.136) drawing attention to the fact that the comparative superiority shown by them during the earlier school years gradually disappears as they become older. Statistical evidence supporting this position is given by Pidgeon (1959). Pringle states that, "In this country no large scale effort has been made either to identify or to remedy under-achievement among able children" (p.138). She believes that the complex nature of under-achievement may require a modification in the attitude of the community and of the peer group towards intellectual achievement before the difficulties will be successfully resolved.

At the beginning of the study the case histories of sixteen of the children in the sample are given. Among them is a boy, aged nine, with an I.Q. of 146, who was referred by the school and described by them as a ring-leader and bully. A girl, although only six-and-half years old, was referred by her school as being beyond control and destructive. In another case, a seven-year-old boy, in spite of having an I.Q. of 139, received the following comment from his headmistress: "His attainment is low enough for an E.S.N. school", while the class-teacher remarked that he was, "A really pathetic boy, who does not know how to smile". One of the cleverest children was referred by his mother because of the boy's dislike of school. At the time, he was 5 years 11 months, and when tested at the clinic his intelligence score was 175.

The latter child perhaps illustrates the problems involved with under-achievement among the highly-able pupils, as presented by Pringle. The head teacher believed the boy's mother over-estimated her son's ability and the school considered him to be an average little boy, who was simply taking rather longer to settle down than was usual. Although he was said to be good at arithmetic, he was considered to be below average in reading. However, his attainment scores at the clinic in both subjects were outstandingly high: his Reading Age was 10 yrs., a Spelling Age 9 yrs. 2 m. and Arithmetic Age 7 yrs. 1 m. Pringle comments that in view of these high scores, the school's views were most surprising.

In the concluding paragraphs of the study, under-achievement is shown to be a progressive ill, with a poor start turning into chronic failure. Pringle says the teacher's understandable disappointment in the poor progress of the child leads to further discouragement for the pupil, so that both, "are caught in the vicious circle of discouragement, disapproval, unresponsiveness and future failure". She continues saying that the only solution is for a continuous programme of early identification and early guidance. In her summing up, she states, "To be given equality of opportunity is the right of every child; to expect equal capacity to make use of this opportunity runs counter to commonsense and experience. In fact, it has harmful consequences because such expectation is bound to engender a sense of failure". (p.139).

Pringle's "Able Misfit" is concerned with the case-histories of a number of intellectually able children who were sufficiently maladjusted to have been referred to a Child Guidance Clinic. This may account for a number of the characteristics noted among the pupils being present to a more marked degree than has been reported in other studies which have been considered here. Nevertheless, her findings regarding the levels of scholastic attainment of intellectually highly-able children are largely in agreement with the other work.

"Gifted' Children in the 1958 Cohort

The entire population of 17,000 children born during one week in 1958 represented a complete cross-section of the child population. It is known as a "cohort" and has been the subject of a number of studies undertaken under the auspices of the National Children's Bureau. One of those made in this series has been of the scholastic attainment levels of a sample of intellectually gifted or otherwise talented children. This will be examined at length since it is the only one of its kind which has been carried out in the United Kingdom in recent years.

In 1965, from the main body of children, a group of 238 able ones were selected. These subjects are referred to as 'gifted' but

Hitchfield, the author of the study, states that this term has been interpreted in the widest possible sense so as to include not only those of high general ability, but also those gifted in any one of a range of specific abilities such as art or sport. Accordingly, the whole sample is not comparable with Terman's longitudinal study of intellectually 'gifted' children in the United States, or with Burt's enquiries into 'supernormal' children, both of which investigations were restricted to children who had scored so highly on an individual intelligence test as to be thought to be within about the top one per cent in intellectual capacity of the population at large. That the studies are not comparable is indicated by the inclusion in Hitchfield's sample of a number of children with W.I.C.S. IQs of less than 110 who may be said to be of average intellectual ability; one child, good at swimming, scored 98 on her I.Q. test, (p.79) and another, a maladjusted girl, a keen runner, obtained an I.Q. of 90, (p.44).

Hitchfield's sample of 238 children were selected from a total list, it seems, of 975 candidate gifted pupils (p.8) on the basis of three criteria (p.7) -

1) Their score on the Draw-a-Man Test when seven years old.
2) Score attainment in reading and arithmetic as assessed by teachers and measured by tests when the children were seven years of age.
3) By parent's letters in response to advertisements, published in the press and on the radio, inviting them to contact the National Children's Bureau if they had a 'gifted' child born in the sample week.

From the children identified in the above three ways, the final group was obtained by the use of random selection supplemented by social class weighting in order to increase the representation of children from Social Class IV and V in the sample. The author of the study states that not all the children in the cohort who could be described as 'gifted' were included; not even all the possible categories of 'giftedness' that could have been defined from the available data, and she adds that, "the information given is about a small group of children who could be said, at the time they were selected, to represent the achievements, circumstances and views of their peers, and to be showing 'promise'." (p.2).

Information was gathered from four main sources:-

1) The schools' assessment schedules which were completed by the teachers on attainment, behaviour, adjustment, etc.
2) Information supplied by mothers and some fathers about the child's home environment.
3) Details of physical development from the School Health Service.
4) The child himself/herself completed a number of attainment and other tests.

The data collected from the schools in the 1965 survey provided the information from which the 'gifted' children were identified, while norms from the 1958, 1965 and 1969 surveys provided the standards against which the 'gifted' were evaluated.

The aims of the study include:

1) The collection of data that would enable 'gifted' children to be described in terms of intelligence, educational achievement, social and emotional adjustment;
2) To enable their performance to be compared with that of their peers;
3) To find out if there were improvements or deterioration in their achievements over time;
4) To determine whether the 'gifted' have any special scholastic or developmental problems arising from their exceptional talent;
5) To collect information which would be of value in future studies when they have become adolescents and adults. (p.6).

The sample was made up of 125 boys and 113 girls to whom the Wechsler Intelligence Scale for Children was given, the resultant mean for the boys on the full scale being I.Q. 131, and for the girls I.Q. 126. Other instruments used were:-

(i) A Piaget type test on propositional logic,

(ii) an information test on Science, Geography, History, and the Arts,

(iii) a Social Reasoning test,

(iv) a Divergent Thinking Test,

(v) the Barron-Welsh Art Scale used to differentiate between artists and non-artists,

(vi) a Sentence Completion test to give information about attitudes to school and home,

(vii) an interview schedule in which open-ended questions were asked concerning the child's attitude to school, teachers, interests, self and friends.

In addition to the above there was information from the second follow-up from the whole birth cohort at the age of eleven. This included tests on verbal and non-verbal reasoning, reading, mathematics, an essay, teachers' assessments on attainments and personality. Other information collected when the children were seven years old and at their birth was also available.

Part II of Hitchfield's study gives the 'Results'. The gifted children are first compared with the whole cohort, secondly described as a group, using the special material collected for them, thirdly comparisons are made between sub-groups of the 'gifted', and lastly, some individual case histories are given to illustrate the uniqueness of particular children.

One of the aims of the work is stated to be (p.16) to see how the sample children fared in school, and it was believed this could be done by looking at the results of their attainments and their teachers' ratings, and comparing these figures with those for the whole cohort. However, the text gives consideration only to a comparison of the teachers' ratings of personality for two groups, those scoring an IQ of 130 and over and those with an IQ of 129 down to 90. On the basis of information given on page 200 the latter group may be sub-divided into those with an IQ of 115 - 130 and those scoring 114 or less.

TABLE 3/2

INTELLIGENCE DISTRIBUTION OF COHORT 'GIFTED' SAMPLE

(Values deduced from p.9 & p.200 of 'IN SEARCH OF PROMISE')

W.I.S.C. I.Q.	No. of Children	% of 'Cohort Sample'
130 and over	114	48
115-130	88	37
below 115	36	15
Total	238	100

Composition of the Study Group

Hitchfield says, "...that the intelligence quotient was resorted to as giving the best categorical unit of analysis". The 15% with I.Qs. below 115 have presumably been included on account of some specific talent such as in art, music or sport, in accordance with the wide interpretation of the term 'gifted' used in her study. No additional assessment of the degree of talent in these areas is mentioned so the criteria for the selection of the children in this group was presumably the ratings given by their teachers or parents.

The IQ distribution of Hitchfield's sample is given in her Table 1 (supplied separately). Since the WISC test has been used a normal distribution with a standard deviation of 15 has been assumed for the whole population. An unselected group of children might be expected to include 2.34% with IQ's over 130, and 13.68% between 115 and 130 approximately. Hitchfield's high IQ group of those with IQ's of 130 and above includes almost half her sample (48%) compared to the 2.34% in an unselected population. There seems, then, justification in designating this high IQ group as "gifted". As regards the upper part of Hitchfield's second group (IQ's 115 - 130) the proportion of subjects which might be expected in an unselected group is 13.68%. Over one-third of Hitchfield's sample (37%) falls within the IQ range, while no objective criteria of talent in other fields has been given - i.e., for sport as compared to national mean and record running times, etc. Accordingly, it appears then that the justification for considering these children as "gifted", whether intellectually or in a specific activity, is dubious. The same arguments follow, but with greater weight, in respect of those subjects (15%) scoring an IQ below 115.

The 'Gifted' Group Compared with the Whole Cohort

The report on Hitchfield's study continues with a comparison of the teachers' ratings for the special 'gifted' group with the ratings for the whole cohort at both ages seven and eleven years.

Reading Ability: Hitchfield records the teachers' ratings as showing that the 'gifted' group was doing well at seven years of age since three-quarters of them were placed by their teachers in the top 30% of the whole cohort. Yet, if one refers to the intelligence distribution, and assumes as before, that for the whole cohort it follows a normal pattern, then the top 30% of the unselected group might be expected to include a number of children whose IQ's were between 110 and 105, that is, the 30% group may be expected to contain children whose ability is usually considered to be within the normal range, since their scores lie within 10 points of the I.Q. mean (see Table 3/3 below). Accordingly, it might have been expected that her 'gifted' group would be so rated by the teachers. However, the band itself is so wide that it fails to reveal whether or not her sample children are reaching their potential - notwithstanding the fact that how such 'potential' has been interpreted has been left undefined.

TABLE 3/3

THEORETICAL NORMAL INTELLIGENCE DISTRIBUTION WITH A STANDARD DEVIATION OF 15

I.Q.	Frequencies as Percentages	Cumulative Frequencies as Percentages
130 and over	2.34	2.34
125 - 130	2.54	4.88
120 - 125	4.38	9.26
115 - 120	6.76	16.02
110 - 115	9.41	25.43
105 - 110	11.66	37.09
100 - 105	13.01	50.10
Below 100	49.92	100.02

Table 3/4 shows the approximate percentage size into which the teachers were asked to classify the level of ability shown by: (a) the whole 'cohort' group, and (b) the 'gifted' in Reading Ability, Mathematical Ability, General Knowledge and Oral Ability.

TABLE 3/4

TEACHERS' RATING CATEGORIES

(Values calculated from Hitchfield's Table 3/3, p.17)

Teachers' Rating Categories	1	2	3	4	5
Approximate Percentage of AGE GROUP	5%	25%	40%	25%	5%
Description	Exceptional	Above Average	Average	Below Average	Very poor or non-reader

Table 3/5 shows the percentage of the 'gifted' group which was rated by the teachers to be in Category 1 in the four areas of the curriculum when the children were aged seven and eleven years respectively.

TABLE 3/5

PERCENTAGE OF 'GIFTED' GROUP RATED BY TEACHERS' AS IN CATEGORY 1

(From Hitchfield's Tables 3/2, 3/3, 3/4, 3/5, 3/6 and 3/7)

AGE	Reading Ability	Mathematical Ability	General Knowledge	Oral Ability
7 years	42	35	28	39
11 years	22	21	16	17

Referring to Reading Ability, Hitchfield notes that some of the 'gifted' group had dropped from the teachers' rating Category 1, given when they were seven years old, to Category 2 when they were eleven years old, but states that since nearly three-quarters of the 'gifted' group were still rated in the two top Categories, these children could still be said to be above average since they remained within the top 30% for attainment in reading. This result is not perhaps particularly surprising since the children were selected on the basis of being 'gifted' in the first place, and almost half of them were selected on a criterion which was intellectually based.

More noteworthy, perhaps, is the fact that about one quarter of the 'gifted' group (Hitchfield's Table 3.2, p. 17), attained a reading level at seven years which was not above that which was obtained by 68% of the cohort as a whole. Further, this lower 68% of the cohort represents the proportion which might be expected to score at about average or below on the intelligence test, so as to receive an intelligence quotient of approximately 110, or below.

An examination of the proportions of the 'gifted' group rated in the two top Categories for reading at age seven (5% and 25%) reveals that deterioration took place in their standard of reading relative to that of the whole cohort by the time they were eleven years. At seven years approximately 24% (Hitchfield's Table 3.2) of her sample group were average or below average readers, but by the time the children had reached eleven years (Hitchfield's Table 3.3), the proportion of 'gifted' children who had only average skill in reading had risen to 29%, while an additional 2% were said to be below average readers.

Mathematical Ability: Hitchfield shows (Table 3.4) that at seven approximately a third of her sample (32%) attained in mathematics, according to their teachers, an average, or below average level (within or below the middle 40% of the whole cohort). By the time the 'gifted' group were eleven there were fewer (28%) rated as average or below average in Mathematical Ability. At the same time, there was a sharp becrease in the proportion rated in Category 1 (described as the top 5% of the 'normal' distribution), the percentage here falling by about one third in the intervening four years (from 35% to 21%).

Here, in order to analyse the values provided, it is assumed (although it is unlikely) that the children placed in Category 1 by their teachers for Mathematical Ability were composed solely of those with I.Qs. of 130 and over. Under these assumed circumstances, it is found that at seven years, over one quarter (27%) of the children placed within the top 2.5% of the intelligence distribution were not placed within the top 5% for teachers' ratings on attainment. Four years later under one half (44%) of the sample children having the top 2.5% of measured ability were rated as being in Category 1 (see Table 3/6 below). If the unlikely assumption made should be untrue, then the proportion of the top 2.5% in measured intelligence not included within the top 5% for the attainment is greater still.

TABLE 3/6

PROPORTION OF GROUP WHO ARE RATED IN CATEGORY 1 FOR ATTAINMENT BY TEACHERS

(No. 114 - High IQ Group only - IQ 130 and over at age 11 years)

Ability	Reading	Mathematical	General Knowledge	Oral
%	46.0	43.9	33.3	35.4

Note: Hitchfield's high IQ group composed of 48% of her sample, 114 children. See p. 200).

General Knowledge: Almost a third (32%) of the 'gifted' group (Hitchfield's Table 3.7) were rated by their teachers as being average or below average in General Knowledge at age seven. By the time the sample group were eleven years old although fewer of them were in the middle and low categories, (26%) there is again a sharp decrease in the proportion placed in Category 1 as against Category 2, the percentage being almost halved, (28% to 16%).

As regards the top 2.5% I.Q. Group, at seven years of age, 42% were not included as attaining in General Knowledge within Category 1 (the top 5%). This had increased by the time the children were eleven years, to 66%, that is, to well over half of them.

Oral Ability: A corresponding position was shown in the area of oral ability. Over 60% of the 'gifted' group when aged seven years failed to be included by their teachers in the top rating Category (Hitchfield's Table 3/5, p.20). Four years later, when the pupils were in the junior school, this value rose to over 80% (Hitchfield's Table 3/6). Hitchfield draws attention to the fact that there is a decrease in the ratings for oral attainment for the cohort as a whole and suggests that this might be partly explained by the later ratings being undertaken by the junior teachers instead of by the infant ones, and the possibility that there was less opportunity for oral work in the junior school. However, the decline is proportionately greater for the 'gifted' group; for the whole cohort there is only a 3% increase in the children placed in the average and lower categories for oral work, while for the 'gifted' group there is a 12% change.

Looking again at the top 2.5% I.Q. Group, then, on the assumption that only the high IQ pupils were included in their Category 1 ratings, at seven years only 18% were not rated the best in Oral Ability by the infant teachers; but by the time they were eleven years old, well over half (64.6%) were not classified among those attaining the highest standard.

Summary of Teachers' Ratings in Hitchfield's Study

At age eleven years, the proportions of the 'gifted' group rated by their teachers to be in Category 1 in attainment (the top 5%) were for: Reading Ability 22%: Mathematical Ability 21%: General Knowledge 16%: Oral Ability 17%.

The proportions of that part of the 'gifted' group which at age eleven years scored within the top 2.5% on the intelligence test, but which failed to be included in Category 1 for attainment, can be calculated to be a minimum of: for Reading Ability 54.0%; for Mathematical Ability 56.1%; for General Knowledge 66.7%; and for Oral Ability 64.6%. The foregoing percentages are for the IQ group of Hitchfield's sample excluded from the highest categories of attainment.

Hitchfield's Discussion on 'Gifted' Group's Decline in Position

Hitchfield does not comment on the percentage of children falling within the top 2.5% of measured intellectual ability who are rated by their teachers as being within the top 5% of the whole cohort in attainments. Rather, she notes (p.22) the proportional decline in position from Category 1 to Category 2 for the 'gifted' group as a whole between the First and Second Follow-ups, and suggests that this could be due to:

1) The natural regression effect - a trend towards the mean in the comparison of scores or grades over a period of time,

2) the fact that 62% of the gifted had at least one rating in Category 1 at seven years, so that this large proportion could change in only one direction,

3) the first rating was undertaken by infant teachers, while the second rating was carried out by the junior school teachers.

Factor 2 would seem to be a restatement of the regression effect already noted under (1). Factor 3 is explained by Hitchfield as possibly the result of different standards being adopted by the junior teachers compared with those of the infant teachers.

There is little change for the cohort as a whole in the proportion of the children rated in Category 1 between the two follow-ups, except for Oral Ability where the proportion of 12% in Category 1 at seven years falls to 3% by the time the children are eleven years. In the case of Reading Ability, the proportion for the whole cohort decreases from 7% to 5% in Category 1 over the four years, but there is no change for General Knowledge at 3% at both ages and for Mathematical Ability the figure rises from 3% to 4%.

Hitchfield does not report on the statistical significance of the changes in the proportions of the rating categories between the First and Second Follow-up Studies.

Comparison of the 'Gifted' Sub-Groups:

(a) WISC IQ 130 and over,

(b) WISC IQ 90 - 129.

The composition of two sub-groups (differentiated according to IQ score) of Hitchfield's sample, are shown in Table 3/7 below. The values have been deduced from her text (p.9 and p.25).

Hitchfield states that because of the general tendency for the proportions in the high ratings to fall in the Eleven-Year-Old Survey compared with the Seven-Year-Old Survey, that it was thought that perhaps the most able children among the 'gifted', Sub-Group a) I.Q. 130 and over, would show more changes in position, particularly downwards but this was not found to be the case. 20% of the children at eleven years obtained at least one higher rating, 35% made no change in position, and 45% had at least one drop in place. The proportions in the two groups, above and below IQ 130, were almost identical, and that proved true of both boys and girls. (p.31).

One may note in this connection that the fact that the proportionate changes did not differ between the two sub-groups, above and below I.Q. 130, was unexpected since the regression effect might have been expected to have a greater result above 130, which is further down the 'tail' away from the mean, than would have been the case below 130, which was nearer to the mean.

TABLE 3/7

SUB-GROUPS ACCORDING TO WISC I.Q. (Full-Scale) OF HITCHFIELD'S SAMPLE

(p.9 and p.25)

SUBJECTS	IQ 130 and Over		IQ 129 and Under	
	%	No.	%	No.
Boys	58	73	42	52
Girls	36	41	64	72
Total (238)	48	114	52	124

Another result which might be considered is that, taking the two sub-groups together, those with an I.Q. below 130 as well as those scoring above that figure, more than twice as many children dropped a category compared with those who obtained a higher rating (45% as against 20%). This point does not seem to have been considered, in spite of the concluding sentence in this section, which was to the effect that, "........ it was necessary to check our results to confirm in as many ways as possible that the more able children, as defined in this study, were not as a group achieving too little, or being underestimated by their teachers". (p.31).

Other Data from Teachers, Parents and Children.

Additional teachers' views on the 'gifted' was obtained by Hitchfield from the material which became available from the second follow-up of the cohort when the children were eleven. From this data the "answers to five open questions" were sought, (p.30) as regards:-

1) any area in which the child had outstanding ability,

2) and 3), the child's most favourable and unfavourable characteristics,

4) an estimate of what the child was likely to achieve in secondary school,

5) suggestions as to the job or career which would suit the child's abilities and aptitudes.

In response to these questions, the teachers had named 50% of the 'gifted' boys and 60% of the girls as having outstanding ability in something; and half of the pupils had two or more subjects mentioned. Hitchfield comments, that it appeared the teachers had interpreted the term 'outstanding' to mean less than the top 5% of the age group since 45 children had been rated as having 'extremely good facility in mathematics' and so came into the top 5% Category of the eleven-year-old population in this respect. 35 were placed in the top 5% Category for General Knowledge, and 83 in the top 5% Category for Use of Books, yet these numbers do not appear again in answer to the 'outstanding' question.

As for the parents, they considered that 77% of the 'gifted' children were exceptionally good at something, compared with the teachers' 55%, while the children's answers fell in between, 64%

of them considering themselves to be exceptionally good at something.

'Under-Achievement'

Hitchfield states that, "expectations that a child with an I.Q. as high as 140, (in the top 0.5% of the population) should score at that level in a number of different subjects frequently arise, but the probabilities of his doing so are very small indeed". (p.34). Referring to Ogilvie (1973) she says, "Something like three children in a thousand with I.Q's of 140 score as high on one attainment test, and perhaps only one of those also as high on a second attainment test".

Pupils with I.Q's of 140 form approximately only 0.5% of the general child population; if only three in a thousand of such children should score as high in an attainment test as in the intelligence test, this would mean such a score in both tests would occur three times among 200,000 children (0.5 x 0.003)! Empirical experience has demonstrated this not to be the case.

Hitchfield's statement seems to derive from a misunderstanding of Ogilvie's Table 1.2, (Ogilvie, 1973, p.12) when taking the top 5.5% of a distribution as being gifted, he shows that the figure decreases to 0.3% of the whole population when the coefficient of correlation is 0.5 and four dimensions of giftedness are embraced. When the top 1.8% are taken, again with a coefficient correlation of 0.5, and the number of dimensions of giftedness embraced is two, the figure is also 0.3%. The 0.3% values do not refer to a percentage of 'gifted' children but to a percentage of the whole child population.

Hitchfield continues, referring to the outcome of two or more tests that this will "depend, of course, on how closely the tests are correlated." In his Table 1.2, Ogilvie gives the percentage incidence of giftedness in one or more dimensions according to whether the coefficient correlation is 0.00, 0.25 or 0.50 as being, for example, where 1.8% are considered to be "gifted" in three dimensions with a correlation of 0.5, as being 0.1% - that is one in a thousand of the total population - but where 5.5% are taken to be "gifted" with the same number of dimensions and correlations, the value rises to 0.6%, that is six per thousand.

In the National Children's Bureau Report, the qualities under review are:- Intelligence as measured by tests, and attainment in Reading Ability, Mathematical Ability, General Knowledge and Oral Ability.

In a number of studies the intelligence test scores have been shown to correlate more highly than 0.5 with the attainment test scores. Burt (1921) gives the correlation between two subjects only, Arithmetic and English tests, as 0.965. These may be taken to cover roughly the same curriculum areas as Reading Ability and Mathematical Ability in Hitchfield's inquiry. Vernon (1940), quoting Burt's results in 1917, shows that for the whole population there is a positive correlation between attainment in different areas of the school curriculum. Thirteen objective tests were given to children aged 11+. The average correlations between each test and the twelve (as against Hitchfield's reference to two) other tests were as follows:-

Burt's Subject Heading		Approximate Equivalent in Hitchfield Study
Reading Fluence	0.323)	Reading Ability
Comprehension	0.369)	
History	0.448)	General Knowledge
Geography	0.456)	
Nature Study	0.458)	
Mechanical Arithmetic	0.283)	Mathematical Ability
Arithmetic Problems	0.457)	
None appropriate	-	Oral Ability

However, it must be pointed out that Burt's figures relate to objective test scores, and not to teacher rating categories as are given for children in the 1958 Cohort.

In contradiction to the view given by Hitchfield, the foregoing evidence points to a reasonably high correlation between measured intelligence and educational test scores for the population as a whole. From this one might postulate a larger correlation between the performances of the 'gifted' group on the two types of tests, due allowance having been made in this latter case for regression to the mean.

Hitchfield continues with a discussion as to what may be categorised as 'under-achievement', and on how far below a measure of general ability (such as an I.Q. score) an attainment score may be accepted as satisfactory level of performance. She specifies the different criteria used by some research workers in defining this concept, and on page 34 she quotes Pringle (1970) as relating, "under-achievement or under-functioning, 'solely to the capacity of the individual pupil'."

The criterion upon which Hitchfield herself bases 'under-achievement' seems to be when for children with I.Q's 130 and over, the pupils are rated by their teachers as only average (in the middle 40% of the age group) on two or more subjects. The case studies of individuals selected in this way were inspected to see whether they might be 'under-functioning'.

Following upon the above specification, a number of children with I.Q's of 130 or more are listed as 'under-achievers': they included only one girl whose I.Q. was 130. Boys with I.Q's were as follows:-

1) Boy with I.Q. 140 - rated below average in Mathematics, and average in General Knowledge, Use of Books and Oral Ability.
He was included because his mother wrote to the Bureau.

2) Boy with I.Q. 146 - rated as average in General Knowledge, Use of Books and Oral Ability.
He was selected on his Draw-a-Man score at seven years.

3) Boy with I.Q. 140 - rated as average in Use of Books and Oral Ability.
His mother is quoted as reporting that the boy said to her, 'What do I need GCE's for as long as I can add money up?'
His father was a deceased miner.

4) Boy with I.Q. 145 - rated average in Use of Books, and Oral Ability.
His parents recommended him for inclusion in the 'gifted' group.

5) Boy with I.Q. 154 - rated average in Mathematics and Oral Ability.
He was selected on his Draw-a-Man score at seven years.

6) Boy with I.Q. 140 - rated below average in Mathematics, and average in Use of Books and Oral Ability.
He had been selected on attainment.

7) Boy with I.Q. 143 - rated average in Mathematics, General Knowledge, Use of Books and Oral Ability.
Identified as 'gifted' by parents' letter.

After looking at the seven 'under-achieving' children in the 140 and over I.Q. group, Hitchfield turns to those who scored between 130 and 140. These are listed below:-

8) Boy with I.Q. 133 - was rated average on General Knowledge, Mathematics, Use of Books.
He was selected on attainment.

9) Boy with I.Q. 134 - rated average in General Knowledge, Mathematics, Use of Books and Oral Ability.
He was selected on attainment.
He is reported to have written, "My teacher thinks I am stupid", and to have said of himself, "I'm not average".

10) Boy with I.Q. 131 - rated average in General Knowledge, Use of Books and Oral Ability.
He was selected as a result of a parent's letter.

11) Boy with I.Q. 133 - rated as average in the Use of Books and Mathematics.
He was selected on his Draw-a-Man score at seven years.

12) Boy with I.Q. 133 - rated average in Mathematics, and below average in Oral Ability.
He was selected on attainment.

As mentioned above, there was only one girl considered to be an 'under-achiever'.

13) Girl with I.Q. 130 - rated as average in General Knowledge and Oral Ability.
She was selected on her Draw-a-Man score at seven years.

Hitchfield states that 48% of the sample scored two standard deviations over the mean on the W.I.S.C. Intelligence Test (p.200). Since the 'gifted' group totalled 238 children (p.9) it can be calculated that 114 children approximately obtained an I.Q. of 130 or more, and that they were, according to this test, in the top 2.5% of the general population in intellectual ability. The thirteen children listed as 'under-achievers' in the fore-going paragraphs represent then 11.4% of the 114 children in the top 2.5% ability group. This seems a large enough percentage of these highly able children to justify serious concern about the extent of 'under-achievement'.

In her "Summary of 'Under-Achievers' ", Hitchfield remarks, "Some of the children when looked at all round were well-balanced, well-adjusted and quite competent enough in literacy and numeracy to achieve anything to which they set their minds. Their special abilities and interests showed that they selected one area for attention rather than another; these personal tastes are a feature of everyone's life, children's rights to them need to be respected as well as those of adults". (p.43). This quotation raises some interesting philosophical questions regarding the aims and objectives of education which cannot be discussed here.

Children Who Do Not Like School

The report records that thirty children expressed dissatisfaction with school. This group consisted of eighteen boys and twelve girls, of whom twelve boys and one girl had I.Q's of over 130. Hitchfield has divided the boys into two categories: a) those who were not scholastic in their interests and turned away from academic work; and b) those who wanted more academic work because they were rather bored at school. It is interesting to note that all the six boys with the I.Q's under 130 came into the first category, while half the boys with I.Q's over 130 came into the second one.

The Children and their Views

In her summary of the views she found expressed by the children (p.105), Hitchfield judges that the highly intelligent children had a particular philosophic difficulty in that, "They were troubled by the concept of infinity which was frightening because they could not control it intellectually". She reports that, "The 'gifted' children revealed no unusual social peer group patterns". However, her last finding might be considered to be of some social consequence. She says, "However, the most intelligent among them emerged clearly as self-appointed leaders". (p.105).

The 'Gifted' Group's School Performance

As regards the 'gifted' group's school performance, it may be noted, thirteen children obtained the maximum of 150+ on the Wechsler Scale and that nine of these (70%) were placed by their teachers in the highest category (top 5%) in at least one of the four areas rated, General Knowledge, Mathematics, Use of Books and Oral Ability. From this one may deduce that the other four children, representing almost a third of this very exceptional highly intelligent group, did not have even one rating by their teachers placing them in Category 1, i.e., they were not placed among the top 5% of their age group in any of the above attainment areas. Looking at these facts, one gains the impression that either the teachers underestimated seriously the work of the children concerned, or, that the children performed in school, for unknown reasons, at a considerably lower level than might have been expected from them, given their measured potential.

Hitchfield next turns to the 140 and over I.Q. group, (p.201), and reports that 19 children, representing 50% of that group, had at least one rating in the highest category. It follows, then that 50% of the group had no rating at all in the highest category, yet commenting upon the school performance of the two groups, 150+ and 140+, Hitchfield states, "It follows that although one or two individuals might have been underestimated, or underfunctioning in school, the majority of the very intelligent children were assessed as above average in most respects". (p.201). One might consider this finding not unexpected in view of the fact that the children were selected in the first place as they were thought to be exceptionally able in some way.

Referring to the rating scale used, (p.201), the author remarks that this was a coarse grading system and that there was a complexity of variables operating on the teachers' judgments since every child came from a different school. One wonders on the statistical reliability of the figures given, bearing in mind the foregoing statement, regarding the composition and subjectivity of the teachers' estimates. Hitchfield concedes that the indications are that teachers are not differentiating finely enough the abilities of their pupils at the top end of the scale. She also puts forward a good case for using more than one test of intelligence, particularly when it is desired to obtain a reliable estimate of children's ability when they are at the top end of the scale. (p.201). In connection with Burt's identification measures for 'gifted' children, the author believes that the results of her study have shown the need to add to the list of ways of identifying such children, the opinions of their parents, and even of the children themselves. She comments, "Many able children know and accept that they are clever in some way and can express this without conceit. It may be important that their judgments should be affirmed".

In her 'Discussion and Recommendations', Hitchfield asserts, referring to the 'gifted' group, that, "They were all achieving reasonable standards in the main skills of basic subjects or literacy which standardised tests of attainment measure, but beyond these many children were having an extension of their all-round abilities by being introduced to a wide range of subject matters and activities which are available to people in our culture". (p.202). Neverhteless, later she adds, "Each teacher a child meets may have his or her own ideas of special interest and pleasure in knowledge, but no one teacher, or perhaps even one school (especially in a small school) can cover the variety of subject matter that able primary children can encompass". In one of the last paragraphs in the study, she draws attention to the fact that both the Plowden Report in 1967, and the Donnison Report in 1970, "Recommend that special arrangements be made for individuals or groups, by means of enriched courses allowing the most able pupils to explore subjects in greater detail, both in and out of school".

Hitchfield's study, one may say, has made a contribution to educationalists' knowledge of the characteristics of gifted children. The cross-section of the British child population provided by the 1958 'cohort' and the fact that her sample was drawn from all social classes and embraced a wide spectrum of talents in addition to specifically intellectual ability has ensured this. At the same time the methodology might have been improved - in particular as regards the identification of gifted children in the cohort and the assessment of the sample children's scholastic standards solely by means of teacher ratings. An opportunity for obtaining much more information of statistical significance, within the limits of the tests available, appears to have been lost.

The Schools' Council Report

The enquiry on behalf of the Schools' Council made by Ogilvie (1973) into the teaching of 'gifted' primary school children, is concerned largely with the attitudes and opinions of teachers as regards the nature and extent of specific problems arising from the presence of outstanding pupils in schools. For this purpose, thirty schools were visited and eighteen teachers' study groups set up.

The definition of giftedness made in the report is stated (p.6) as follows:- "the term 'gifted' is used to indicate any child who is outstanding in either a general or specific ability, in a relatively broad or narrow field of endeavour.... Where recognised tests exist as (say) in the case of 'intelligence', then 'giftedness' is defined by test scores". Most of the teachers who were consulted suggested an I.Q. of 130 was a suitable cut-off point for intellectual giftedness. (p.11).

Ogilvie also outlines a curriculum model comprising of "a number of more or less distinguishable activities, or 'dimensions'." (p.8). He continues, "Each dimension is characterised to a greater or less extent by developmental sequences, and on each the individual achieves a certain position". He states, "The goal of both teacher and learner is to change the pupil's location on some or all of the dimensions in a forward direction.... at optimum speed". (p.9).

On the basis of the general definition of 'giftedness' and of the curriculum model given above, Ogilvie sets out, "three major conclusions, which are of the utmost importance for the consideration of giftedness....".

> 1) Actions which tend to reduce the extent of intercorrelation among curriculum activities hold out the promise of a greater number of children experiencing outstanding success. Actions which increase these intercorrelations will reduce the numbers.
>
> 2) The more disparate the activities, and the larger the number available, the less likely it is that talent will remain undetected and undeveloped.
>
> 3) Problems of giftedness form a part of the total of those concerned with individualization. (p.23).

In other words, the greater the variety and scope of the activities encompassed within the school curriculum the greater the likelihood that whatever particular gift or talent a child possesses, there will be opportunity for its development as catering for giftedness represents one aspect of individualisation of learning.

In the course of putting forward the above theses, Ogilvie expresses the belief that the view taken by those who argue that the highly intelligent should receive special educational treatment on the same grounds as do the "slow learners" is too simple. He points out that whereas the "slow learners" tend to appear as a group, regardless of which particular dimention or dimensions are used for their identification, this happening will be far less true with regard to highly intelligent children.

Ogilvie puts forward and analyses the concept of "polymathic giftedness". On the basis of his previously stated wide definition of giftedness which includes all exceptional capabilities whether the result of mental or physical abilities or any combination of both, Ogilvie examines the incidence of giftedness. He calculates the frequency of its occurrence to be expected when encompassing one or more dimensions, and according to the extent of correlation existing between those dimensions. (See his Table 1.2, p.12). He follows this with an examination of the incidence of specific giftedness along any single dimension (Table 1.3, p.13). Taking as his starting point the percentage of individuals who are considered gifted on one dimension - he calculates how this value will be increased when giftedness is taken to be present as a result of exceptional performance in any one of a number of different dimensions. For instance, if one particular ability such as an exceptional talent in Mathematics is present in 5.5% of a population and if three other activities are included as well as showing other types of giftedness (i.e. say running, needlework and car maintenance), then the percentage of gifted persons found in the population, on the basis of the foregoing definitions, will be between 15.6% and 20.2% individuals according to the degree of correlation between the dimensions. The proportion of children will be larger when the correlation between the activities is lower. Ogilvie calculates that, "with zero intercorrelations and only four dimensions, a fifth of the age group will fall into the top 5.5% on one or other of the dimensions". (p.13).

As regards 'recognition' of 'gifted' children, Ogilvie points out that, "some teachers expect real giftedness to emerge of its own accord". (p.31). However, he adds later (p.32 & p.33), "Although some tend rather to think in terms of talent, as it were, waiting to be spotted in a sort of all-or-nothing way, others have more of a continuum in mind; all are concerned that the teacher should be in a position to assess the child's capacity".

Ogilvie reports, too, that from teachers answers to questions it appears that, "in the professional opinion of most teachers there is a risk that intellectual giftedness will remain unrecognised unless greater care is taken; there is certainly an a priori case for looking closely at the situation in the light of evidence from other sources". (p.42).

The teachers' study groups listed what they considered to be the primary needs of 'gifted' pupils as follows:- (p.35 & p.36)

1) Contact with their average peers.
2) Contact with children of a comparable level of ability.
3) To be stretched and challenged even to the point of experiencing failure and humbling experiences.
4) To be guided rather than directed through a more academic approach to a greater depth of treatment.
5) To avoid being set apart but to have opportunity to set self apart on occasions.
6) To pass rapidly through elementary stages and use advanced resources.
7) To pursue their own lines of research.
8) To be exposed to some form of counselling - and their parents too.
9) To be treated like other children.

Subsequent discussion in Ogilvie's study returns to the essential requirement of the 'gifted' child to be recognised. Since before this initial step is taken, appropriate measures for his/her special needs are almost precluded. Further, as teachers have pointed out, the number of the 'gifted' who pass unrecognised cannot be known so it is not possible to estimate the size of the problem.

For the above reasons Ogilvie recounts that it was decided that interested teachers should undertake their own investigation of the problem and eight schools were involved in this enquiry. Two of the schools seem to have approximated the number of 'gifted' children fairly closely, five understated seriously the number of their roll, while in the case of one school where there were thirty-three maladjusted children, Ogilvie comments: (p.52)

(i) In comparison with average mental age all thirty-three children under-achieved in all subjects, (100%);

(ii) In comparison with average chronological age, twenty children under-achieved in all subjects, (60%);

(iii) One child had attainment age level above chronological age in all three subjects, (3%).

The mean I.Q. of the thirty-three children was 129.6.

Subsequent discussions included were those concerned with anti-intellectualism in schools and 53% of the teachers felt that this was present in some degree. (p.112). Ogilvie's book incorporates a number of case studies of 'gifted' children and includes a digest of teachers' views on the scholastic needs of such pupils as well as facts relating to actual school practice.

The next section of Ogilvie's report considers the extent to which the Local Education Authorities provide guidance to teachers on how they may recognise and cater for 'gifted' children. In reply to questionnaires 17.5% of the L.E.A.s said they provided some assistance, while 70% made no provision; an established referral system exists in 26.3% cases but in another 59.9% there was no provision. It was found, too, that many Authorities screened pupils at about the age of eight years with Group I.Q. and Reading Tests. However, Ogilvie recounts, (p.130), "Two striking facts arose from one small investigation of this procedure:

(1) The intelligence tests were never examined with a view to discovering the most able as well as the most backward.

(2) The reading test in use had an age ceiling of 7.9 years. This has been changed, but the ceiling for the new test is only 11.8 years."

Ogilvie's work has made available a large body of valuable information on gifted children. This relates (a) to teachers' opinions on the extent to which gifted children have special needs in school, (b) to current experience in such institutions and (c) to the nature and extent of the provisions made for this category of children by L.E.A.s. As such his study will assist determinations on methods whereby improved facilities for gifted children may be introduced in the future.

Research Into Standards of Reading

The longitudinal study undertaken by Yule et al. (1974) in the Isle of Wight into the reading attainment of 425 pupils drawn from a population of 2,000 primary school pupils, is of interest in the present context since Yule's study examines the scholastic attainment of two groups of children in relation to their measured I.Q.

Yule follows Rutter et al. (1970) in distinguishing between 'backwardness' and 'retardation', the definitions adopted for these Terms being as follows:- (p.245),

> Reading backwardness - an attainment in reading accuracy or comprehensions on the Neale test 2 years 4 months or more below the child's chronological age.
>
> Reading retardation - an attainment on either reading accuracy or reading comprehension which was 2 years 4 months or more below the level predicted on the basis of the child's age and Short WISC IQ Predictions were based on a multiple regression equation (Yule, 1967).

The above distinction made in Yule's study between 73 'backward' pupils having a below average IQ with a mean of 85.6 and 71 'retarded' children of average intelligence (mean 98.4), i.e. those "who were so far behind as to be well below the level expected on the basis of their intelligence," (p.246).

It should be mentioned, however, that the objectives of Yule's project and the present thesis are dissimilar. Yule appears to have been concerned with the causes of learning difficulties including physical disabilities, and analyses the scores gained by pupils in a battery of tests on Accuracy, Comprehension, Mathematics and Spelling with their IQ scores in order to investigate the relationship of scholastic performance with measured IQ. The present study regarding pupils who have obtained high IQ scores has the more limited objective of determining whether a gap sufficiently larger to be statistically significant is present between the two sets of scores gained by the high IQ group as compared with control pupils. It is not concerned directly with the predictive value of the IQ scores in relation to scholastic performances and accordingly multiple regression techniques have not been used. However, the justification for establishing whether or not such a gap between the IQ and attainment scores exists does relate to the assumption that IQ scores have been shown to be predictive of future scholastic attainment by psychometrists such as Vernon who have shown such scores to have predictive value for pupil populations gaining a normal distribution of IQ scores. Nevertheless, the correlation coefficient between the two groups of scores for the sample stuied here have been calculated (see Appendix A, p.370).

Notwithstanding the foregoing and the concern with reading disabilities, it is interesting to note that the researchers in the Isle of Wight study, found the gap between performance and measured ability to be greater for their "brighter" children. Commenting upon their results, it is stated (op.cit. p.247), "On all three measures of reading, the duller, backward readers do better than the brighter retarded readers. In other words, the intellectually more favoured group are somewhat more handicapped on their reading". This point is reiterated in the concluding remarks where it is said, "One cannot assume any longer that the bright children with reading difficulties will catch up. Good intelligence in a disabled reader is no talisman against long-lasting reading difficulties." (p. 248).

Tempest's Liverpool Study

It was suggested by Prof. Tempest in his address in 1970 to the Royal Society on the subject of gifted children in primary schools that it is the business of education to help each child to do his best in all the activities of the schools' programme. Referring specifically to gifted children, he considers that the opinion is frequently held that, "the able boy or girl will do well at school anyway, so why worry about him?". This he believes to be merely a tautology since a pupil who has been recognised as 'able' is already doing well. It simply says that the boy or girl who is doing well at school will do well at school. Accordingly he asks whether if a ten-year-old with an I.Q. of 140 is performing very satisfactorily at school, "the kind of work normally done by children of his age" whether he is "doing well enough?". (p.255 & 256). However, Tempest considers that it is in addition doubtful whether even the experienced teacher is bound to know who are the gifted among his pupils.

Tempest reports that for the Liverpool Study, 72 children were nominated as gifted by their teachers in Southport in 1967. Of these, 24 obtained IQs of 127 and above on the test used, 39 scored below 127, seven of the latter were below 110, and one child scored 84. Accordingly, it seems that the teachers misjudged as gifted approximately ten per cent of their nominees as this proportion was found by the researchers to be of more nearly average ability. However, the most able thirty children were selected from the 72 suggested names and of these fourteen, or about 50%, were nominated for inclusion in the project. Nevertheless, Tempest adds that since the children were aged about seven years (being in the last term of the infant school), identifying the gifted among them was difficult. Even so, he found it surprising that the two children whose reading age, as measured by the Schonell Word Recognition Test, was six years above their chronological age, were not nominated by their teachers as gifted. Fifteen children were finally included in his experimental group.

The aim of the Liverpool Study was to bring together a group of gifted children to be taught as one junior school class for the four years from seven plus to eleven plus. The group selected had divergent thinking scores ranging from low to high, and IQs on the Wechsler Intelligence Scale for children from approximately 130 to 150. It was found that not all the gifted children showed up at seven as exceptionally good readers.

Tempest discusses some of the problems resulting from having a bright child in the ordinary school class. He considers the child's readiness to answer the questions often before the teacher has finished asking them, or his offer of suggestions and information irrespective of whether or not the time is suitable, may result in the teacher continually telling the pupil to be quiet and to wait until she calls on him to answer as otherwise the others in the class will get no chance. The difficulty is not, as with so many other children, to obtain a response from the pupil, but to restrain him without at the same time fostering in him a growing feeling of frustration. Tempest quotes Milton (1965) who states, "The real issue in education of the gifted, as in education of children with moderate and low intellectual ability, is individualisation of content, materials and method". (Tempest, 1971, p.259). It was to this end that the main aim of the Liverpool project was directed since the objective was to devise a suitable curriculum supported by specialised study kits, work-cards, etc., designed specifically for the gifted child.

Referring to the team's experience with the gifted group, Tempest reports that some of the children in his sample when in the second year juniors were doing the mathematics normally done by second year grammar school pupils. However, he cautions that in giving the gifted pupil work which would challenge and extend his abilities, problems would arise in such fields as mathematics. He suggests that it is quality rather than the quantity of the output which should be the aim and in this is in agreement with Bridges (1969). Tempest suggests that the intelligent child who asks original questions in a conformist setting may provoke derision from his class-mates, and rebuke from his teacher for causing disturbance; accordingly, the pupil soon learns to win approval either by keeping quiet altogether, or saying what he thinks is expected from him.

Tempest also supports Martinson (1968) in her view that, "Much of our error in dealing with the upper reaches of human potential lies in qualitative underestimation rather than in overestimation". He adds, referring to the problems involved in allowing the highly able child to proceed to work which would challenge him, "I would argue that to avoid them by holding the gifted child back is much more dangerous and, indeed, reprehensible, as it denies him the opportunity of fully using his abilities, an opportunity which, it is generally held, the schools should provide for all their pupils". (p.261).

In the final paragraph of his lecture, Tempest states that the ground has hardly been broken in the field of education of gifted children in the United Kingdom. He calls for much more work and many more workers to investigate this comparatively neglected area of enquiry.

More recently Tempest (1974) again draws attention to the fact that while the difficulties of the backward and the slow-learners have been widely studied, little attention has been paid in Great Britain to the clever children who make up two or three per cent of their age group. He states the belief that those able children who attain well are not necessarily satisfied but are bored if their work is not sufficiently challenging, and that others do not do well either because their abilities remain undiscovered, or because they are unsuited to the kind of education offered.

Two key questions are raised by Tempest: how are clever children to be recognised at the early age of seven? and how can their abilities be challenged in school? A further account is then given of how, in order to help answer these questions, the Liverpool University School of Education brought together a group of clever seven-year olds who scored 130 or more on the Wechsler Intelligence Scale for Children. These pupils were observed during the course of four years when they were taught together in one class but in other respects formed part of a junior school. The idea behind the project was that the experience of teaching such a group would furnish suggestions for the enrichment of the curriculum of other gifted pupils. It was hoped the study would provide examples of methods of work and general attitudes which would be helpful to teachers having only one or two children of exceptional ability in their classes.

The author reports that specialist teachers were used for teaching music, science and German, as a second language. He goes on to deal specifically with various learning activities, such as 'Find Stars and Space with Patrick Moore'. The main body of the book gives practical examples and suggestions of new material which may be introduced into various areas of the curriculum such as in science, the arts, etc.

Tempest considers further study to be necessary on such measures as 'acceleration' and 'enrichment', both methods frequently recommended for gifted pupils. He believes that first the meaning of these terms should be examined, and thereafter their optimum application.

In dealing with the problems of recognition, Tempest points out that for many children, especially as they grow older, the opinions of their companions become more important than those of their teacher. Children do not like to be thought odd; the clever child who is laughed at soon learns to conceal abilities for which he is unpopular with his classmates, but where an ability such as being good at football meets with approval, then he will display it. He sums up, "A clever child has the ability to assess a situation and whether, or how, his cleverness appears may depend to an important extent on this assessment".

Next, the author turns to the question of expectations and he postulates that if the gifted child can easily and quickly accomplish that which will gain the approval of his teacher and parents, he will have little incentive to do more. Further, the child may well become bored and his parents may have difficulty in sending him to school; or, "he may look around for more challenging problems and become a ring-leader in all sorts of mischievous exploits".

Tempest estimates that teachers will regularly encounter such children since they probably form about two per cent of their age group. He continues, arguing that they are the counter-part of the slow learners and since the general expectation of learning is understandably related to the majority in a normal classroom, "The minority at the two extremes will need special help, but it is not always realised that this is true not only of the 'slow-learner' at one end but also of the quick one at the other".

The four years over which a group of fifteen intellectually gifted children received special teaching as a single school class has provided a practical example of the ability of gifted pupils to learn more quickly a greater spread of subject than found with most children of a similar chronological age. Accordingly, Tempest's study has made an important contribution to an understanding of the learning abilities of such children by teachers and others. In addition, a selection of the work schemes used during the four-year experiment has been made available for use in primary schools and as such is likely to prove of assistance in supplying educative material for other gifted children.

The Manchester Survey, 1951

At the secondary school stage the relationship between attainment, ability and environment, has been examined by Wiseman (1964) as a result of large surveys of the school population in North-West England undertaken in 1951 and 1957. 15,000 children, aged 14+, were tested in Lancashire on specially constructed and standardised tests of educational achievement. The administration of tests in reading comprehension, mechanical arithmetic and verbal intelligence was carried out by the teachers. The tests were repeated after a month's interval and the results were examined statistically for reliability and a test re-test correlation was carried out.

Although the whole school spectrum of ability was surveyed, the researchers were mainly interested in the two extremes of the intelligence range, the bright and the backward. (p.20). Two groups of pupils were distinguished: Group A) included those scoring an IQ of 115 or more which took in 16% of the children; Group B) was made up of those with an IQ of 85 or less. Account was taken of the phenomenon of regression to the mean when ends of a distribution were being examined.

Some of the results of the statistical calculations are set out in three tables, (p.20 & p.21). In these comparisons are made between the mean raw scores and standard deviations obtained by type of school - grammar, technical, selective central, modern and all-age schools. The distribution of scores of intelligence and those for reading and arithmetic are shown related to the whole sample, as is the distribution of 'brightness' and 'backwardness' in the different school types. Other tables show the Product-Moment Correlations between the scores of the 'backward' and 'bright' groups respectively for intelligence, reading and arithmetic in relation to mental deficiency, illegitimacy, neglect, etc. An examination is made of the contributary factors leading to 'backwardness' and 'brightness' from which it is concluded that these characteristics "are not just simply the obverse and the reverse of a single coin". (p.95).

Wiseman (1966) includes a contribution made in the Lancashire study by Warburton who calculated statistics for the relationship between the environment in forty-eight schools and levels of scholastic attainment. Tabulations of correlations are given between 'brightness' and 'backwardness' and the levels obtained in the formal school subjects according to the type of school - the latter are classified in respect of the degree of progressiveness adopted in their teaching methods, the size of the school's classes, the 'atmosphere' of the school, etc. In each school attainment was expressed as the percentage of 'bright' and 'backward' children, (i.e. those scoring one standard deviation either above or below the mean in the Greater Manchester sample) in intelligence, reading comprehension and mechanical arithmetic respectively.

Warburton concludes that the relevant factors under-lying attainment are, in decreasing order of importance:- intelligence, socio-economic status and large enrolment. He remarks, (p.104), "It is obvious that intelligence is an important factor in scholastic attainment and that, if we do not pay heed to this, differences which are at first sight due to social factors might, in fact, merely reflect differences in the intellectual capacity of the children".

He uses factor analysis multiple correlation to separate out two other important ingredients - the first Factor 1 accounting for some 24%, he states, "is clearly a socio-economic factor", while Factor II which "counts for 18% of the variance" seems to represent "what might be called school atmosphere". (p.113).

Higher correlation coefficients for intelligence than for reading or arithmetic is described by Warburton as the most surprising single finding (p.119). This latter result is "in precise contradiction to the theoretical expectations". A similar result was found in a second survey conducted in 1957 when a sample of twenty schools, one-fifth of the secondary schools and covering a school population of 1,500, were stratified by type. (p.126).

Other aspects of the results of the two surveys are compared by Wiseman. He states, "one of the most significant results of our enquiries was the demonstration of a substantial improvement in standards of educational attainment in the tool subjects from 1951 to 1957".

Regarding the above finding, Wiseman comments that, "This is as it should be in view of the many improvements in the educational service". He expresses the view that it is desirable that educational achievements should continue to rise both as regards the number of individuals and their standards of attainment. However, he continues with the observation that, "It is almost certainly true that no human-being ever succeeds in achieving his full potentiality" but he believes it to be the function of education to bring him as close to it as possible. "This", he says, "is true of all levels of ability and within all social classes". He continues, "The gap between achievement and possibility is almost certainly greater, however, the further we proceed up the scale of ability. I believe that, at present, we have no conception of the levels of achievement possible for the highest intellects among our children; there is an enormous reservoir of ability waiting to be tapped". (p.152). He accepts that the intelligence test estimates "potentiality as opposed to achievement" only imperfectly but argues that it is nevertheless "the best way - the only way" of making such a judgement. He continues, (p.155), "The evidence seems inescapable that the intelligence test, however imperfect it may be in comparison with the psychologists' concept of the ideal, is a good less affected by cultural and background influences than are tests of attainment, and as such it is an invaluable tool for research purposes".

Under the sub-heading, 'Intelligence and Attainment', Wiseman discusses the unexpected finding that the intelligence test results are more affected by environmental factors than are the results from the two attainment tests, (see previous p.77). He suggests that in the poorer socio-economic districts the teachers give more emphasis to Reading and Arithmetic at the expense of the more liberal studies carried out in the prosperous suburban schools, (p.156). As a result reading and arithmetic attainment may have been raised above IQ level so that the relationship between the environmental factors concerned with the locality correlates more closely with IQ than it does with attainment. This explanation is considered to be supported by evidence from a study of the individual schools. On the hypothesis, it is to be expected that both 'backwardness' and 'brightness' will be affected, "since the crux of the argument is not so much the increased effort given to backward pupils as the effect of this on the whole school time-table - but the reduction of backwardness in schools in poor areas ought to be greater than the increase in brightness as measured by our basic tests of reading and arithmetic". (p.158). Wiseman holds that the evidence for this deduction is provided by his Table 6.10 setting out the partial correlations with intelligence when the two attainment tests are separately held constant. The correlations with school neighbourhood are: -.47 and +.24 respectively when reading is partialled out: and -.49 and +.22 when arithmetic is so treated. Wiseman argues this 2 : 1 ratio and the similarity of the results are what might be expected. Partial correlations of the opposite kind (with intelligence held constant) are +.19 for backwardness in reading, and only +.09 for arithmetic, while the corresponding values with brightness show a reverse difference of +.18 for reading and +.28 for arithmetic. The values seem to indicate that the schools are more successful in overcoming backwardness in arithmetic than with reading in the poor areas. Partial correlations with brightness show a difference in the reverse direction for reading. The method of measuring backwardness and brightness was relative to the mean score.

Although the Manchester Surveys were concerned with secondary school children of 14+ years whereas the study here is concerned with pupils of primary school age, the study appears relevant to the present project. Wiseman and his team were concerned with the relationship between measured intelligence and performance on attainment tests covering a similar curriculum area as those featuring in the present project - furthermore, their findings were based on large samples of children.

Points which are of particular interest in the above work in the present context are:- firstly, the re-iteration of the importance of intelligence tests as a means of measuring intellectual ability for scholastic achievement; secondly, variation in the nature of the educational problems posed by children of exceptional intellectual ability as compared with pupils below average in this respect; thirdly, evidence of the influence of the ethos of the school and of the effects of emphasis on particular sections of the curriculum on standards of attainment as well as of other influences which have been generally recognised and finally, Wiseman's deduction that the gap between potential and achieved performance is likely to increase with greater intellectual ability for numerous reasons but also as he says, quoting Parkyn (1948), "partly because most of the teachers of such highly intelligent children are less able than their pupils, partly because class-teaching tends to be geared to the average, and the highly superior pupil may spend more than half his class time in irrelevant and unproductive activity".

FIRST WORLD CONFERENCE ON GIFTED CHILDREN - 1975

The report of the first world conference on gifted children (ed. Gibson & Chennells, 1976) reflects a resurgence of concern regarding the developmental needs of gifted children. Held in London, the conference was attended by 500 delegates from 50 countries and papers were given by many internationally known speakers. A threefold categorisation may be made of the contributions:- a) those adopting a philosophical approach to the potential possessed by gifted children; b) reports upon research findings into appropriate teaching methods, etc; and c) the educational provisions made for gifted children in a selection of the countries represented by the delegates.

The general theme of the conference was in agreement with past findings reported in the literature on gifted children and which have been reviewed here in the proceeding pages. In his contribution, Torrance analysed the extent to which gifted children already thought about future happenings and how they might be encouraged to give such events greater and more responsible thought. Passow's paper is directed to the important subject of creativity, - on its importance, and on the manners by which gifted children may be assisted in developing creative thought. Parkyn, too, is concerned with creativity - particularly the contribution that gifted individuals may make towards "the recognition of a pattern of values that transcends the scientific humanism characteristic of the past century and aspires to a closer relationship between man and the rest of the universe". (p.35). As regards identification of the gifted, he believes there are two basic aspects to be considered - "The first is the ability of gifted children to progress rapidly through the known and accepted stages of development of rational thinking, ethical sensitivity, and aesthetic awareness. The second is their potential ability to achieve new insights beyond those already known". (p.47).

Attention is given to the practicalities of educating gifted children by a number of contributors. Gallagher examines suitable methods of adding to the normal school curriculum by both extending and deepening its content to include greater stress on advanced conceptualisation" (p.66) so as to meet the needs of gifted and talented pupils. He also discusses the practical development of specialist programmes by teachers. Provisions for musically gifted children are considered by another author while further contributions cover "work-shop" activities and pre-school gifted children.

The most important paper regarding governmental measures for the education of gifted and talented pupils as such is provided by Lyon, of the U.S. Office of Education. He recounts that commencing about five years ago, in response to a request from Congress for information regarding the education of the "gifted and talented youth", hearings were held in ten regions and over five hundred experts testified. (p.25). Following upon submission of the subsequent report, Congress has now legislated funds specifically for the gifted. Priority had already been given to training teams of five leaders for work with the gifted and talented in each of forty-eight of the fifty states. The funds now provided will be utilised to:-

1) Plan and evaluate at State government level and to develop the plans which have already been prepared.
2) A programme of in-service training for teachers.
3) Develop model local demonstration projects and projects which can provide models for other areas of the state and country. (p.26).

In contrast to the current position in the United States, outlined above, may be set the picture drawn by a Danish teacher. She states, "the emphasis in my country is laid on the average school child and his needs. The child who is behind is helped forward, and the child who is ahead must try to fit in and receive his intellectual stimulation outside school". She continues, "The ideal of influential political parties has been stated by the minister of education, and goes as follows: no child may be taught anything which exceeds the capacity of any one child in the class". (p.299).

The coverage of many of the issues involved in the education of exceptionally able pupils by experts in a number of different fields has resulted in the report of the conference proceedings forming an important source of information on the education of intellectually gifted children as well as of those possessing other exceptional talents.

CONCLUSIONS

On reviewing the literature on scholastic performance in relation to ability both in the United States and in this country, a general consensus of opinion has been found that the intellectually most able children are not achieving, relative to their potential, to the same degree as the less able pupils. This finding, noted by Burt in his London Surveys, has been confirmed by other researchers. Precise data as regards Burt's 'super-normal' group are very limited; where such information is available, e.g., for the long-term study undertaken by Terman and Oden, the indications are that there is a serious under-use of potential. Other investigators, as by, for example, Tempest and Bridges, are in agreement that some of the brightest children are not using their ability to the full. The results of the whole of the long-term concern and experience regarding the education of very able pupils has largely been drawn together and synthesised into a single body of knowledge by the proceedings of the recent world conference on exceptionally gifted and talented children.

In the above situation, it seems desirable that a closer look at the circumstances of gifted children in the United Kingdom should be undertaken. As a small contribution to a future major research project in this area of educational research, the present pilot investigation is undertaken.

CHAPTER IV

THE PRESENT STUDY - METHODOLOGY

Need for an Investigation

As has already been said, little recent work has been done in this country on children who score at the upper end of the intelligence scale. Educational research, at any time, is fraught with problems of measurement and definition, but when dealing with the highly intelligent, the unknown delineations are even greater. Accordingly, since the difficulties involved in studying highly-able children are so considerable, the only contribution this project can make is to high-light some aspects of the circumstances of a sample of children in the top one to two per cent of the intelligence continuum. The study here will be concerned mainly with such pupils' school environment. It is undertaken in spite of the problems involved because it is felt to be of importance.

Aims of the Present Study

The aims of this study have been limited by the small resources available as well as by the imperfect nature of the instruments which must of necessity be used. In the circumstances, it is only investigatory, the intention being to provide some pointers for a subsequent larger research project regarding the development of intellectually highly-able children which, it is hoped, will be undertaken in the future.

Given the above-mentioned limitations, the first objective of the present undertaking is to study a group of children who have scored highly on intelligence tests. Their performances on attainment tests in English and Mathematics, relatively to their intelligence test scores, will be compared with corresponding performances by a group of control children.

A second objective has been to form a general picture of how highly intellectual children are fitting into the primary school environment. In this connection, information has been sought through the use of questionnaires addressed to the pupils' parents, their teachers and the children themselves. The same questionnaires have been completed in respect of the control children.

Interpretation of "High Intellectual Ability"

For the purpose of this investigation, intellectual 'high ability' will be defined as the ability to score 141 or more on the Stanford Binet Intelligence Scale.

It has been decided not to adopt the wider view of talents which is embraced in recent works in the United States, (Torrance, 1971; French, 1964) and in this country, (Ogilvie, 1973; Hitchfield, 1973), for two reasons, the first of which is to limit the field of study. Secondly, tests in creativity and abilities such as in the arts, music, sport, or social ability, are less well-developed or, in a well-standardised form, non-existent. Further, where instruments do exist, their statistical reliability and validity are even more open to question at the extreme upper end of the distribution of ability than at the more intermediate levels. While the same may be said of the measures which have been used in this study, the extent of such a short-coming may be expected to be less as the tests have been developed over a longer period of time. The instruments used here have been selected as among those which are the best recognised and hence likely also to be included with those tests providing the more accurate approximate measurements in the higher ability range.

The Sample

A sample of over sixty intellectually highly-able primary school children has been studied. These pupils were selected from nominations made by parents, teachers or educational psychologists on the basis of an IQ score of 141 or over on the Stanford Binet scale.

In addition, a group of control children of average-bright intellectual ability who contrasted with the experimental group as regards measured intellectual ability has been obtained. An IQ of 130 has been taken as the upper limit for children to be included in the control group, so leaving a gap of ten IQ points between the experimental and control groups. Any child scoring an IQ of over 130 and under 141 when tested has been excluded from the study.

All the control group children were chosen by the teachers. The latter were asked by the investigator to select a child of average ability to match each of their pupils in the experimental group in respect of:- a) sex, b) membership of the same school class within the school, c) similar socio-economic background, and d) chronological age.

The total sample group includes approximately equal numbers of infants and junior children. The subjects have not been drawn from a particular year-group because of the difficulty of locating over sixty children falling into the top one per cent of measured intellectual ability. To have restricted the chronological age of the participating juveniles to one-year group would have provided a more homogeneous body for the research study but would have meant a large increase in costs and the number of schools involved would probably have had to be doubled in number.

A further reason for including the entire primary-school age range is connected with the objectives of this work. As has been said, the current study is only investigatory, the intention being to provide some indicators of the manner in which a larger research into the field of high-ability children might be best directed. By the present strategy of taking individuals from each of the different year-groups, more of the problems likely to be encountered in a future comprehensive survey can be specifically high-lighted. For instance, the different problems presented in studying 'first year infants' as compared, say, with 'first year juniors'; similarly, the different situation encountered when dealing with 'top infants' as compared with 'top juniors'. Variations and similarities in the nature of the problems met in research concerned with highly-able primary school-children in different year-groups are considered later in the section devoted to discussion on the findings of the present enquiry. (Chapter VII).

The pupils in the present sample have been drawn from over thirty primary schools. No criteria other than geographical convenience and the likelihood that the school would include one or more intellectually highly-able pupils on its roll have been used in selecting the great majority of the participating schools. However, while the foregoing procedure included establishments in predominantly working-class or lower middle-class areas, on surveying the neighbourhoods served by the schools, it appeared that a disproportionate number were located in mainly middle-class areas. Accordingly, towards the end of the field-work, three schools were deliberately chosen in working-class areas in an endeavour to widen the socio-economic background from which the sample was drawn. Only one of these three schools has contributed a pupil to the sample since the other nominees did not score sufficiently highly on the Stanford Binet Scale to be included.

Altogether, 32 primary schools co-operated in the project, having a total toll of 8,310 children of which thirty contributed one or more highly-intellectual child to the sample. The search for highly-able children was not exhaustive among the school population concerned and it is to be expected that there were other highly-able children among them who were not identified.

THE TESTS

Since the present study is concerned with a group of intellectually highly-able children and comparing them with a group of average-to-bright children, one of the first tasks was to select an instrument whereby it might be established which children should be included in the experimental group and a relative measure of the corresponding ability of the control children might be obtained. Appropriate tests too had to be chosen in order to obtain a measure of the children's level of attainment in Mathematics and English language. Finally, questionnaires had to be designed to give some factual information, and the subjective views of the teachers, parents and children on the progress and situation of both groups of children in their primary schools.

Intelligence Tests: There are three ways whereby the intellectual ability of individual children may be estimated. These are by:-

(i) The use of a recognised individual intelligence test by a trained psychologist.

(ii) The use of a group intelligence test.

(iii) The opinion of the child's teacher.

The first method is generally accepted as the most accurate on account of its objectivity and standardisation procedures. Accordingly, a child's score on the individual psychological test will be taken here as the standard against which other forms of mental measurements are compared.

Stanford Binet Intelligence Scale: The 1960 Third Revision of the Stanford-Binet Intelligence Scale has been selected as the instrument for the measurement of the children's potential in this study. It has been chosen as being one of the best-established and most well-recognised intelligence tests available. The Scale is a measure of general rather than specific ability, and it assumes that general intelligence is a trait which develops with chronological age.

The Stanford-Binet Intelligence Scale is based on age and a child is considered to be of normal intelligence if he/she performs as children of his/her age normally do, while he/she is retarded if his/her test performance corresponds to those younger than himself/herself, and accelerated if his/her success level exceeds that usual for individuals of his/her own age. This gives rise to the concept of 'Mental Age' upon which the Scale is based. Since age standards of performance have been used in the calculation of the Intelligence Scale, each subtest item of which the overall Scale is made up, has had to be shown to have an increased percentage of passes for successive added units of age. The choice of the material which went into the sub-tests themselves was such that the mean Mental Age of unselected subjects should agree closely with their mean chronological age. To do this it was necessary to select a representative population at each chronological age.

The 1937 standardisation of the Scale took in 3,184 subjects and the chronological ages of these were distributed so that for each half-year interval between 1 yr. 6 mths. to 5 yrs. 6 mths. there were 100 subjects each, while from the ages 6 yrs. to 14 yrs. there were 200 at each age. The 1960 Revision was made using the results of more than 5,000 tests administered during the 1950s, and which in turn have been compared with the results obtained from the original standardisation population.

As previously, the present L-M Form of the Scale is made up of a number of sub-tests and Mental Age is computed by taking a combination of the highest sub-tests passed. An individual's score is gained as a result of the tests he passes in relation to the chronological age at which the majority of the subjects passed each of the sub-tests in question. The individual's Intelligence Quotient is then calculated from his particular Mental Age in relation to his Chronological Age.

The manual states, (p.62) that there has been "correction of structural inadequacies in the 1937 scale, first by the introducing adjustments to make the average mental age that the scale gives more nearly equal to the average chronological age at each age-level, and second, by providing revised and extended IQ tables that incorporate built-in adjustments for atypical variability of IQ at certain age-levels, so that the standard score IQ's provided are comparable at all age-levels".

The reliability coefficients for magnitude of IQ have been computed for the different chronological ages separately. For IQ 140 - 149, for age six to thirteen years, the reliability coefficient is 0.91. For the age range from 2½ to 5½ years, it is lower at 0.83, but it seems likely that the last half year, i.e. between 5 yrs. and 5½ yrs., the only one of the latter set with which the present study is concerned, is more likely to have a higher reliability coefficient than the average of 0.83 since one would expect the 2½ to 3½ yrs. age range results to have less than the mean level of reliability.

The validity of the Intelligence Scale has been verified in respect of: (i) the 1916 tests; (ii) the criterion of chronological age and the fact that each test item must show an increased percentage passing from one age to the next; (iii) the internal consistency of the test has been established upon the criteria that each test item must correlate with the Scale as a whole; and (iv) factor analysis of the test items included in the 1937 Revision.

Although in the past a disadvantage resulting from using the Stanford Binet Intelligence Scale has been that it tended to exaggerate the intellectual capacity of those scoring at the extreme upper end of the Scale, it is hoped that this has now been at least partially corrected. The manual for the Scale states that the new table given in the 1960 edition has been corrected by an amount that compensates for differences in variability of standard deviations at the various age-levels. An example is given of a child of twelve years of age who has a mental age of 16 yrs. 6 mths. By the new 'deviation' method, the resultant IQ is 132 as compared with 138 by the simple ratio of age to mental age used previously. At the same time, the rarity of subjects scoring over 2.5 standard deviations from the mean, and the limited amount of work which has been done at the extreme upper end of the distribution of intelligence, makes the values statistically suspect whatever test is chosen.

The second reason for selecting the Stanford Binet Intelligence Scale is its widespread use in earlier studies with highly intelligent children. Although the revisions which have taken place mean that results using the 1916 Binet Test, the 1937 and 1960 Revisions are not directly comparable, it is possible to make approximate comparisons - certainly more so than if a completely different instrument was used. In the latter event it is likely that a different concept of intelligent behaviour would be involved and there would be less comparability with Terman's longitudinal study in the United States, with Burt's London Surveys or with the more recent work in the States such as that undertaken by Pegnato and Birch.

In the present study use has been made of the 'mental age' given in the test manual for a given performance. As has already been stated, although the term 'mental age' has been retained, in the 1960 Revision it represents a deviation score on an age-based scale. Where very high 'mental ages' have been earned by a few of the sample pupils resulting in an IQ above the 170 for which published tables are provided, the formula supplied in Appendix 'A' of the manual (p. 388) has been used.

To summarise, the Stanford Binet Intelligence Scale has been selected as it is a predominantly verbal scale, because it has been the most generally used instrument in previous research studies on high ability children, and in the revised version performance is measured in terms of standard scores.

Wechsler Intelligence Scale for Children: This is an alternative instrument which might have been used to establish a measure of the ability of a group of highly intelligent children. This newer test renounces the concept of Mental Age basing its distribution of scores solely upon the percentile level of success in the individual sub-tests at each age level.

The W.I.S.C. seeks to measure a wider spectrum of intelligent behaviour than the Stanford Binet and the sub-group tests are divided equally between those which are predominantly verbal and those which mainly test manipulative performance. Since the present study is concerned with the cognitive ability of very intelligent children and their levels of attainment in English Language and Mathematics, the more verbally orientated Stanford Binet Scale seemed preferable. The very fact that W.I.S.C. does take account of manipulative skills on its full scale might have resulted in a highly intellectual child whose ability was restricted on performance, gaining a lower score than would reflect his true level of cognitive ability. For instance, this might well have been the case with spastic child who has been included in the highly-able sample.

Group Test: Simplex Junior Intelligence Scale: In one school a group intelligence test was given to a teacher-selected group of children.

The scores obtained on this instrument have been compared with those the children obtained when tested individually on the Stanford Binet Intelligence Scale.

The Simplex Scale has been selected for this purpose since it has been standardised on the complete population of 12,000 children in one urban area, the pupils ranging from 6 yrs. up to 14 yrs. in age. The manual states the percentage of children answering each test item correctly at each age to have been computed and the 'reliability' or internal consistency of the Scale is given as 0.95, this having been determined from a group of 100 ten-year-olds whose scores had a standard deviation of 14. The 'validity' of the instrument is given as 0.93 when the test scores of the same group of ten-year-olds were correlated with a careful set of teachers' estimates of the children's intelligence.

Other reasons for the adoption of the Simplex Scale are that in addition to being well-established, it has recently been revised so as to include metric measure and the new monetary system. It uses the concept of Mental Age in order to measure intelligence, so that it is comparable with the Stanford Binet Intelligence Scale. The chronological age range covered by the Scale is more than adequate to cover all junior school children, while items are included in the test of sufficient difficulty to provide an adequate ceiling for the high-ability children. Lastly, it is easy and convenient to administer.

For the above reasons, the Simplex Group Test appeared a suitable instrument for testing at the upper end of the intelligence continuum.

Attainment Tests: In this study, the National Foundation for Educational Research tests have been used to provide a measure of the level of the attainment in Mathematics and English Language, by the sample pupils and in Reading for some of the infants.

The N.F.E.R. is an independent organisation devoted to progress in education and mainly financed by the Local Education Authorities and the Department of Education and Science.

The Foundation states that most of their tests have been standardised on samples of 3,000 to 5,000 children and that individuals have been tested over the entire ability range. The raw scores gained by the children are converted into a common scale so that the obtained values may be inter-related. The N.F.E.R. tests are based on a standardised range of scores from 40 to 160, with 100 as the mean. They are so constructed that extending upward and downward from the mean are four divisions of 15 points (the Standard deviation) into which it has been arranged that constant percentages of the standardised scores will fall. The resultant distribution is set out in Table 4/1 below. (NFER, 1972, p. 4).

TABLE 4/1: FREQUENCY DISTRIBUTION OF STANDARDISED SCORES USED BY N.F.E.R. TESTS

Score	Percentage of Distribution
85 - 100	34.13
100 - 115	34.13
70 - 85	13.54
115 - 130	13.54
55 - 70	2.14
130 - 135	2.14
40 - 55	0.13
145 - 160	0.13

Note: Mean = 100 S.D. = 15
The actual range of scores given in the test manuals is from 70 - 140.

Note: Information from: - Table for Converting NFER Standardised Scores to Percentiles (NFER Tests 1972, p. 5).

The N.F.E.R. test scores relate an individual child's performance to that of other children of the same age in the sample studied. Since the scale of values is standardised attainment on different tests can be compared and the scores can be added together. (NFER, 1972, p.4). The standardised scores can also be used to express performance by means of percentiles. The reliabilities of N.F.E.R. standardised tests are usually calculated by the Kuder-Richardson formula 20 internal consistency method and the test constructors claim that reliabilities of 0.997 are commonly obtained.

The Foundation states that their tests can be used for six main purposes: (op.cit. p. 3).

1) To find the strengths and weaknesses of an individual child.
2) To rank children within a particular year group.
3) To estimate progress over a period of time.
4) To compare performance in different subjects.
5) To compare the performance of a child, or group, with the performance of other children of the same age.
6) To compare children of different ages.

The present research study is designed to make just such comparisons as listed above. One of its main objectives is to compare the attainment standards of highly-able children with the performance of others in the same age group. The relative standards of performance of the two groups of children on attainment tests in Mathematics and English will be compared with the Stanford Binet mental age level the children have reached.

Calculation of Educational Ages and Educational Quotients: A major difficulty in assessing the attainment levels of high-ability children is that no tests designed for this purpose are currently available. The tests have been developed to span, in most cases, a chronological age range of eighteen months; less usually, the tests cover an age range of from twelve to thirty months.

Most of the N.F.E.R. tests are scaled so that the majority of children in the centre of the age range for which a particular test is designed, will obtain a standardised score of 100, ±1 standard deviation of 15. The standardised score of 100 relates to the mean (that is, the centre) of the age range spanned by the particular test, and the raw score equated with a standardised score of 100 represents the mean level of performance of children of that chronological age on the given test. However, when tested, some children at the mid age range will obtain a standardised score above or below 100 in the proportions as shown in Table 4/1, (p.149), and this acts as a measure of their relatively higher or lower attainments. Account is taken in the standardised score awarded in respect of the same raw score for children being either older or younger than the mean age for the test but between the upper and lower limits of the age range concerned. This age allowance made in the standard score gained means that the younger child, at the lower end of the age range covered by a given test, who obtains the same raw score as a child in the middle of the range, will yet obtain a higher standardised score. As a result, it is possible to calculate an educational age (in reppect of the particular test in question) from the standardised score.

Educational age is a figment upon which a measure of a level of attainment in one or more scholastic subject areas may be based. For the purpose of this study it refers to the mean level of performance of unselected children of a given age. Accordingly, by definition, the educational age of children performing at the mean level will be equal to their chronological age.

Since the standardised score of 100 represents the mean performance level at a given age, a child of such chronological age who obtains a standardised score of 100 may be said to have the same educational age as his chronological age: children with higher chronological ages than the given age whose standardised score is 100 nevertheless, will have lower educational ages than chronological ages; while younger ones who score also 100, will have higher educational than chronological ages.

To take an example: the whole age range covered by English Progress B.2 is from 8 years 6 months to 10 years 0 months. At the middle of this range, 9 years 3 months, the raw score 22 gives a standardised score of 100; at age 8 years 6 months the same raw score 22 gives a standardised score of 107; while at 10 years 0 months the standardised score is 93. Thus, there is a change of 15 points in standardised score over 19 months of chronological age given on the published table of values which is supplied with the manual for this test.

The educational age of a child with a standardised score of 100, that is, who has performed at the mean level on the test, and who is also at the mid-point of its intended age range, may be considered to be the same as his chronological age of 9 years 3 months. Similarly, the child with the same raw score of 22 at the lower limit of the age range 8 years 6 months has a standardised score of 107, and will have a more advanced educational age. From the published table of values it may be calculated that there is an age allowance of 19/15 months for each unit of the standardised score. Hence it follows in the above case that:-

$$\text{Educational Age} = 9\text{y. } 3\text{m.} + \left(\frac{19}{15} \times 7\right)\text{m.} = 10\text{y. } 0\text{m.}$$

That is, where a child gains a standardised score over 100, if the value for the age allowance in months per unit of standardised score is multiplied by the number of additional points, the resultant value may be added to his chronological age to give his educational age. Conversely, where the standardised score is below 100, a corresponding subtraction may be made.

For the majority of the N.F.E.R. attainment tests, the printed tables give standardised scores ranging from 70 to 140, thus covering a range of 70 points. In the case of the English Progress Test B.2, as has already been shown, the rate of change in the standardised score is $^{19}/_{15}$ months per unit of score. From the foregoing, it follows that for two children of the same chronological age, there may be a theoretical difference in educational age of:-

$$\left(\frac{19}{15} \text{ months} \times 70 \right\} = 89 \text{ months} = 7\text{y. } 5\text{m.}$$

To the above educational age time span may be added the difference between the chronological ages of the oldest and youngest pupils for which a given test is designed. In the case of B.2, this interval is nineteen months. If the latter period is added to the 7y. 5m. found above, the result is a total theoretical span of 9y. 0m. of education age. Notwithstanding the previous argument, the N.F.E.R. conversion tables for B.2 extends only from S.S. 83 at 8y. 6m. to S.S. 139 at 10y. 0m., from which may be calculated a total educational age range for this test of 6y. 9m.

However, the published NFER conversion table for test B.2 does not allow an equivalent variation between CA and EA for those pupils with a low attainment score to be distributed proportionately similarly as for those with a high result. This may be seen from the following values:-

TABLE 4/2

RELATIONSHIP OF STANDARDISED SCORE, CHRONOLOGICAL AGE & EDUCATIONAL AGE, CALCULATED FROM NFER CONVERSION TABLE FOR ENGLISH PROGRESS TEST B.2.

Mean CA - 9y. 3m. Mean SS - 100	EA 9y. 3m.
Upper limit CA - 10y. 0m. Upper limit SS - 138	EA 14y. 0m.
Lower limit CA - 8y. 6m. Lower limit SS - 83	EA 7y. 4m.
Span of EA Overall	= (14y. 0m. - 7y. 3m.) = 6y. 9m.
" " " from Mean to upper limit	= (14y. 0m. - 9y. 3m.) = 4y. 9m.
" " " from Mean to lower limit	= (9y. 3m. - 7y. 3m.) = 2y. 0m.

As may be seen from the Table 4/2 on this page, the difference between the upper limit of educational age with a standardised score of 138 at chronological age 10yrs. 0m. and the mean standardised score of 100 at the mean chronological age of 9yrs. 3m. is 14 yrs. 0m. less 9 yrs. 3m. which is 4 yrs. 9m. The difference between the lower limit of EA with a SS of 83 at CA 8yrs. 6m. which gives an EA 7yrs. 4m. is only 2yrs. 0m. below the mean.

The same method may be used to obtain the educational age range of other NFER tests, although there is some difference in the ratio of the span of chronological age to educational age between the different tests. The variation between the upper limit of chronological age and the upper limit of educational age on the main tests used in the present study, ranges from 1 yr. 8 m. on English Progress A.2 designed for children aged 7 yrs. 3m. to 8yrs. 11m., to

7 yrs. 4m. on Basic Maths DE designed for children aged 10yrs. 6m. to 11 yrs. 9m.

N.F.E.R. Attainment Test Ceilings.

The above-specified ceilings for the N.F.E.R. attainment tests are adequate in order to provide an approximate measure of the level reached in English language and Mathematics for the pupil of average ability. The upper limits of educational age were also found to be adequate for the bright-average children in the Control Group of the present study. However, the ceiling was not found to be high enough in the case of some individuals of exceptionally superior ability among the Highly-Able Group.

The difference between the chronological age and the mental age as given by the Stanford Binet Scale in the case of some of the seven and eight-year-old highly-able children is four or five years. Accordingly, these children may score at the ceiling of the attainment test designed for their age group and obtain an educational age held down below that of which they are actually capable on the linked attainment tests in the series as a whole. Such a position arose with one highly-able child of 11yrs. 1m. who had a mental age of 21yrs. 1m. and whose attainment test score hit the ceiling of English Progress D.2 and Basic Mathematics DE.

Educational Age and Educational Quotients: The methods by which educational ages have been calculated in this study have been explained above. In addition, educational quotients have been obtained as follows:-

$$\text{(1)}\quad \text{Educational Quotient} = \frac{\text{Educational Age}}{\text{Chronological Age}} \times 100$$

$$\text{(2)}\quad \text{Educational Quotient} = \frac{\text{Educational Age}}{\text{Mental Age}} \times 100$$

For example, with a child aged 10yrs. 0m., who has an educational age of 12yrs. 0m. and a mental age of 15yrs. 0m., the quotients will be:-

$$\text{EQ(1)}\quad \frac{\text{EA}}{\text{CA}} \times 100 = \frac{\text{12y.0m.}}{\text{10y.0m.}} \times 100 = 120$$

$$\text{EQ(2)}\quad \frac{\text{EA}}{\text{MA}} \times 100 = \frac{\text{12y.0m.}}{\text{15y.0m.}} \times 100 = 80$$

The use of the concepts of educational age and educational quotients, as illustrated on the previous page, has received criticism (Vernon, 1960; Crane, 1958; and Burt, 1958). It is accepted here that the use of such measurements are open to error and that their use in giving a prognosis for an individual child must be with great caution. However, in the present study relationships between chronological, educational and mental ages and quotients calculated from them are used to compare the performances of two groups of children who have worked tests in the same test series, and in most cases the same actual tests. Errors of reliability and validity are likely to be similar for both groups; account will be taken of the effect of regression to the mean.

The concepts of educational age and educational quotients are introduced in this study in order to relate mean levels of performances on the stanford Binet Scale to those exhibited on N.F.E.R. tests of attainment. While the scores in both series of mental measurements are now calculated through the use of percentiles, the published tables still make use of the terms 'years' and 'months' in presenting the calculated values. As has been shown, the age allowance incorporated into the tables of standardised scores published in the manuals for the N.F.E.R. tests, allows the calculation of educational age in years and months, while the same units of measurement are involved in the 'mental age' used by the Stanford Binet Scale. It is a matter of convenience when investigating differences in performance between two groups of children to make the comparison between measured intelligence and attainment in terms of mental age, educational age, intelligence quotients (I.Q.) and educational quotients.

Achievement Indices - the 'Gap' Between Mental Measurements: Burt

(1958, p.260) holds that, "statistically ratios are always unsatisfactory measures: and a ratio of two ratios the most unsatisfactory of all". He continues stating, "to compare a child's actual attainments with his potential ability it is much better to take (in italics) differences between standard measures". Accordingly, in the present study a second set of values regarding the relationships between chronological, mental and educational ages have been computed. These latter sets of values are termed here "educational indices" to distinguish them from the foregoing ratio values (p.155). Achievement indices have been determined as follows:-

Achievement Index (1) = Educational Age - Chronological Age

Achievement Index (2) = Educational Age - Mental Age

The foregoing example of a child aged 10yrs. 0m., who has an educational age of 12yrs. 0m. and a mental age of 15yrs. 0m. by the second method of calculation gives the following results:-

Achievement Index (1) = 12y. 0m. - 10y. 0m. = + 2y. 0m.
Achievement Index (2) = 12y. 0m. - 15y. 0m. = - 3y. 0m.

Limitations of N.F.E.R. Attainments Tests for Highly-Intellectually-Able Children: The N.F.E.R. tests have been designed so that 68.26% of unselected children will obtain a standardised score of from 85 to 115 (NFER, 1972). Although the test developers state that the sample of children on which the standardisation was based covered the entire ability range, and that 0.26% of the children gained a standardised score of 130 to 145, some of the N.F.E.R. tests designed for certain age ranges have a ceiling too low to give an adequate measurement of achievement for individual exceptionally intellectually highly-able children included in this study.

The upper limits of the educational ages which may be calculated from the published tables of scores of particular N.F.E.R. tests, have been in a number of cases below the children's age. Should it be that any of such pupils were to achieve an attainment level near his mental age, this occurrence would not be reflected in the obtained value so falsifying the results. In fact, the ceiling of the N.F.E.R. tests designed for the appropriate chronological age group has had such an effect on the resultant values for a number of the highly intellectual children in one or both of two respects.

Firstly, for some individuals the level of difficulty presented by the test questions has been such that nearly correct, or completely correct, scripts have been produced by pupils young in age for the test. In these cases an extrapolated standardised score has had to be calculated since most of the N.F.E.R. published conversion tables do not provide for scores over 140.

The extrapolated standardised score has been computed on the assumption that the relationship of chronological age to attainment is a constant function - and on this basis it has been calculated as follows:-

For a given raw score, the rate of change in the standardised score may be calculated from the values on the published table and the latter value then be used to determine the extrapolated SS. The calculation is shown below:-

$$(1)\quad \text{Gradient for a given raw score} = \frac{\text{Change in standardised score}}{\text{Number of months between limits of standardised score}}$$

Then:

$$\left.\begin{array}{l}\text{Extrapolated SS}\\ \text{for that Raw}\\ \text{Score}\end{array}\right\} \quad \text{SS at a chosen age} + (\text{Gradient} \times M)$$

Where M is the number of months below (in which case it is positive) or above (in which case it is negative) the age at which the standardised score is taken.

The following example may make the above procedure clear, using English Progress Test B.2.

(1) Gradient for RS $= \dfrac{\text{Change in SS } (107-93)}{\text{No. of months } (120-102)}$

$$= \frac{14}{18}$$

For 'Child A', aged 9y. 3m. (i.e. 111m.) with RS = 47,
published table gives SS = 130

Then for 'Child B', aged 8y. 0m. (i.e. 96m.) with RS = 47,

$$\underline{\text{Extrapolated SS}} = 130 + \frac{14}{18} \times (111-96) \text{ Months}$$

$$= 130 + (\frac{14}{18} \times 15)$$

$$= 142.$$

Where the use of an extrapolated standardised score has been necessary, educational age has been calculated from the formula:-

(2) Given that where Mean SS = 100,
Educational Age = Chronological Age

Let GS = SS for a given raw score and chronological age:-

Then: Difference between obtained SS and Mean SS

$$= 100 - \text{GS}$$

$$\text{and EA} = \begin{pmatrix}\text{CA at which} \\ \text{obtained}\end{pmatrix} - \frac{(100-\text{GS})}{\text{Gradient from (1) above}}$$

In the foregoing example using English Test B.2,

'Child X' with CA 9y. 0m., RS 18, SS 100, has

EA = 9y. 0m.

'Child Y' with CA 8y. 0m., RS 39, SS 127 has

$$\underline{\text{EA}} = 96 \text{ months} - \frac{(100-127)}{\frac{14}{18}}$$

$$= (96 + 34.7) \text{ months}$$

$$= 10\text{y. } 10\text{m.}$$

In the second case where children have produced completely correct scripts they may not have been able to show the upper limit of the level of scholastic attainment of which they are capable. This difficulty has been met by giving such pupils the test designed for the next older age group. An extrapolated standardised score has then been obtained on the latter test, using the method outlined above.

The procedure adopted has been to give the tests appropriate to the children's chronological age in both English language (and in some cases Reading) and Mathematics to the highly-able children and the pairing children in the average-bright control group. Where individuals in the highly-able group have scored three points or less from the maximum available on the test, these pupils have been given in addition the attainment test for the next higher age group. Since none of the average-bright control children achieved within three marks of the maximum, no parallel need arise to give a more advanced test with this group. Nevertheless, where it has been found necessary to give a more difficult test to an highly-able child, this advanced test was also attempted in some cases by the average-bright pairing control child. However, the practice was discontinued as it was found to be unsatisfactory with the children of more normal ability level found in the control group.

A third difficulty arose in the case of some of the control infants - this was of the reverse order to that presented by the highly-able children above. The series of linked N.F.E.R. tests in English and Mathematics which were designed to cover children in junior school classes and the early years of secondary school, extended downwards to cover only the 'top' infants and made no provision for the younger infants. It was necessary, therefore, to give children aged five and six years tests in English and Mathematics designed for seven-year old pupils. Though this procedure is unsatisfactory, the alternatives were either to use completely different instruments produced on other criteria of test construction or to exclude consideration of the young infants altogether from this section of the study. An added possibility was the introduction of the N.F.E.R. reading test designed for six-year olds.

The appropriate, or most nearly-so, N.F.E.R. attainment test in English language and Mathematics were given to both the highly-able and the average-bright control children.

Notwithstanding the fact that the younger infants were between one and two chronological years below the age for which the tests were designed, the great majority of the highly-able pupils worked the tests satisfactorily and obtained raw scores. In the case of Mathematics, nearly all the average-bright control children also obtained a raw score but the simplest of the English language tests was too difficult for some of them to attempt. Accordingly, a reading test with a lower age limit was then added and a raw score, even if a low one, was obtained for most of them. Where the reading test was used, it was also given to the highly-able pairing child. In this way a raw score in both Mathematics and in the English subject area was obtained for nearly all the control children. Extrapolations of the conversion table of raw scores to standardised scores was carried out by the same procedure as described above in order to obtain a measure of the infants' level of attainment on the same principle as explained above (p.159).

Although these procedures will have led to an increase in the degree of statistical error in the subsequent calculations, it has been judged here to have been the preferable alternative. Had the displayed performance of those individuals capable of exhibiting an exceptionally high level of attainment been pinned down by the ceiling of the test designed for their own chronological age group, the degree of under-achievement shown by subsequent calculations involving the test scores of the entire highly-able group would have been exaggerated. In the case of the infants, as stated above, the alternative would probably have been not to attempt to measure their level of attainment at all.

Attainment Tests Used in Present Study

In the present study, two series of attainment tests have been used, one for English language, and the other for Mathematics. In addition, a primary reading test was given to some of the pairs of infants, and three of the older, very highly-able children, worked through a secondary mathematics test. A list of all the measures of attainment used is given in Table 4/3: with the exception of the last named, all the tests were untimed as it was felt that this would give a truer measure of the children's attainment level and would lessen any strain upon them.

It has been necessary to use two series of linked tests rather than a single test unit in each of English and Mathematics since the chronological age range of the sample stretched over six years, while the children's mental ages ranged from 6y. 4m. to 21y. 1m. No suitable attainment test was found which was constructed as a single test unit and covered this wide age span. Accordingly, the two series of dovetailed units of the N.F.E.R. English Progress Tests and the Basic Mathematics Tests were selected. Continuity exists within each of these series and the link-up is assisted by an overlap in the age ranges between the individual test units. Although it would have been more desirable to have used only one instrument each for English language and Mathematics, this was not possible since most of the N.F.E.R. attainment tests are limited to an age span of between one and two years.

TABLE 4/3

N.F.E.R. ATTAINMENT TESTS USED IN PRESENT STUDY OF HIGHLY-ABLE CHILDREN

TEST	AGE RANGE (Inclusive)
English Language:	
Reading Test 'A'	6y. 9m. - 8y. 9m.
English Progress A.2	7y. 3m. - 8y. 11m.
" " B.2	8y. 6m. - 10y. 0m.
" " C.2	9y. 6m. - 11y. 0m.
" " D.2	10y. 6m. - 12y. 0m.
" " E.2	11y. 0m. - 12y. 6m.
Mathematics:	
Basic Mathematics 'A' (Oral) ...	7y. 0m. - 8y. 0m.
" " 'B' (") ...	8y. 0m. - 9y. 0m.
" " 'C'	9y. 0m. - 10y. 6m.
" " 'DE'	10y. 0m. - 12y. 6m.
" " 'FG'	12y. 0m. - 14y. 6m.
Secondary Mathematics Test	

English Attainment Tests

The Primary Reading Test used in this study was standardised in 1971-72 on 7,249 children. The four linked English Tests A.2, B.2, C.2, and D.2, which have been administered were all standardised on samples of between 4,000 and 6,000 pupils. The lowest Reliability Coefficient for any of the individual test units is 0.969; the largest standard error is 2.78, allowing for additional error away from the mean at the lower chronological ages.

Reading Test 'A': This is of the sentence completion type and is designed for use with children in the last year of infant and the first year of junior school. The instrument is designed for testees aged 6y. 9m. to 8y. 9m. inclusive. A conversion table of raw scores to standardised scores, incorporating an age allowance, is provided by the test constructors.

In the present study, extrapolations from the published values have been necessary for children who were under 6y. 9m. These have been calculated in the manner described above (p.163).

English Progress Test A.2: This test was standardised on the scores of all the children (4,776), aged 7y. 3m. to 8y. 11m., in two Borough authorities in 1964 and 1965.

In the present study, where the test has been used for children below the intended age, extrapolated values have been calculated as previously described (p.158).

English Progress Test B.2: This test was constructed by the N.F.E.R. in conjunction with the English Group of the Surrey Educational Research Association. It is designed for children aged 8y. 6m. to 10y. 0m. The scores of 5,458 pupils aged 8y. 9m. to 9y. 9m. were used to construct the conversion table of raw to standardised scores. The published values down to 8y. 6m. and up to 10y. 0m. were extrapolated by the test construtors.

For the present study, fewer additional extrapolations were necessary than in the cases of those test units already discussed. Where further calculations have been necessary, the same procedure as before has been followed.

English Progress Test C.2: This test is aimed at pupils aged 9y. 6m. to 11y. 0m. and is intended for use in estimating the attainment in English of third year junior pupils. It was standardised on 5,499 pupils aged 9y. 9m. to 10y. 9m. The conversion table was constructed from these children's scores and it was extrapolated downwards to 9y. 6m. and upwards to 11y. 0m. by its producers.

Further extrapolations from the published table of standardised scores in respect of scores obtained by individuals included in the present study were only necessary in a few cases. Where such calculations were required, the procedure adopted was the same as for the previous tests.

English Progress Test D.2: Designed for testing performance in English language of fourth year junior pupils, the test manual gives the age range covered by the test as being 10y. 6m. to 12y. 0m. The accompanying conversion table of raw to standardised scores was produced from the scores of 4,096 children gained in three areas in 1963-64. The pupils tested ranged in age from 10y. 7m. to 11y. 8m., the values given at the upper and lower age limits in the published conversion table being extrapolations from the obtained scores. Recognised statistical procedures were adopted by the test constructors.

The values used in the present study have been calculated on the basis of those tabulated by N.F.E.R. The procedures adopted for arriving at standardised scores and educational ages were as have already been described. (p.160).

Other English Tests: Two other tests, English Progress Test E.2 and English Progress F.3 were used in the present study for individual children who had scored the maximum raw score, or within three marks of it, on the tests designed for their chronological age. English Progress Test E.2 had not yet been standardised at the time the present work was carried out but a provisional standardisation had been carried out in 1969 of English Progress Test F.3 with 1,500 children.

Mathematics Attainment Test

In recent years a large part of the curriculum content of mathematics courses has changed radically. On the one hand the foregoing has been the result of the introduction of the 'New Maths' as an alternative to the traditional mathematics syllabus; on the other, the units of measurement has changed with the alteration in the United Kingdom's monetary system to become a decimal currency and the adoption of other metric scales.

At the time this study was undertaken, an investigator was faced with the alternative of adopting traditional tests in mathematics which had been well-standardised but which had become outmoded; or of adopting new tests, taking account of modern developments, but for which only provisional norms were available or which to date were unstandardised. In the present study preference has been given to the newer tests as many of the children were already unfamiliar with the older system and standardised scores would become available in due course.

The N.F.E.R. have developed a series of 'Basic Mathematics' tests during the last few years aimed at measuring "children's understanding of some of the fundamental mathematical relationships and processes which form the basis of mathematics". (N.F.E.R., 1971, Manual, Basic Maths Test DE., p.1). The questions are said to have been designed to eliminate as far as possible the effects of different teaching methods.

The 'Basic Mathematics' test series covers a chronological age range of from 7y. 0m. to 15y. 0m. and its various units have been used to measure mathematical progress in the present project. As in the case of other N.F.E.R. attainment tests, the mean standardised score is 100, the standard deviation being 15.

Basic Mathematics Test 'A': This test was first introduced in 1971 and at the time of its utilisation in the present study was still unstandardised.

The test is presented orally to the children so that the testees are not required to read the questions and it does not, therefore, discriminate unnecessarily against poor readers. The test constructors state that the obtained scores can be interpreted as reasonably 'pure' measures of mathematics attainment.

According to its developers, Basic Maths 'A' is intended for children aged 7y. 0m. to 8y. 0m; it has been constructed to provide a measure of how well ideas presented in the infant school have been grasped by pupils.

Although no table of standardised scores was available, the Foundation provided the author with the means and standard deviations of obtained raw scores per month of age from 7y. 1m. to 8y. 8m., together with the formula for linear transformation of the raw scores to a transmuted score given below:-

Where X = Raw Score
$\bar{X}$ = Mean Raw Score
S.D. = Standard Deviation
Y = Transformed Score
(or transmuted score)

$$\frac{X - \bar{X}}{S.D.} = \frac{Y - 100}{15}$$

The standardised scores for Basic Maths 'A' included in the present study have been calculated with the above formula. The procedure for obtaining mathematical educational ages has been the same as outlined previously (see p.158).

Basic Mathematics Test 'B': This test is the second unit in the series and according to the manual it is intended for use with children aged 8y. 0m. to 9y. 0m.: like the previous one, the presentation of the test is oral.

A conversion table of raw scores obtained on Basic Maths 'B' to standardised scores has been provided by the test publishers. This is based upon the obtained scores of 4,047 urban children in 1973, aged 8y. 4m. to 9y. 7 m.

The values used in the present study and based upon Basic Maths

'B' have been calculated as previously described (see p. 158).

Basic Mathematics Test 'C': Basic Maths Test 'C' is the third in the series; it was standardised on over 8,000 scripts written in 1971-72 by third year primary school children aged 9y. 8m. to 10y. 9m. A conversion table of raw to standardised scores has been published on the basis of the foregoing obtained scores, extrapolations being made for one month both downwards and upwards to take in the age range 9y. 7m. to 10y. 10m.

The procedures for the present study have been as already described for other tests.

Basic Mathematics Test 'DE': The manual for Basic Maths Test 'DE' gives the intended age range of this test as being 10y. 3m. to 12y. 9m.

The scores of 3,874 children aged from 10y. 6m. to 11y. 9m. (who worked the test in 1972) have been used to produce a conversion table of raw to standardised scores covering a corresponding age range. The conversion table for this test was provisional only since the number of obtained scores available was comparatively small.

At the time Basic Maths 'DE' was administered to sample children in this study only provisional standardised values, as described above, were available. In the circumstances, these were used in the subsequent calculations made, the procedures following the same pattern as already outlined in respect of the other tests used.

Secondary Mathematics: - Basic Mathematics Test 'FG': The manual for Basic Maths Test 'FG' gives 12y. 3m. to 14y. 9m. as the approximate age range towards which the test is directed. The questions were administered to 1,579 pupils in 1969 in the follow-up study of the N.F.E.R.'s Streaming Project. The children were attending 83 different secondary schools, streamed and non-streamed, Grammar, Secondary Modern or Comprehensive. A provisional conversion table of raw to standardised scores has been produced by the developers which covers the age range 12y. 9m. to 13y. 8m.

In the present study Basic Mathematics Test 'PG' was given to a number of exceptionally able children who had already scored highly on Basic Mathematics Test 'DE'. Calculations based upon the obtained test scores were as previously described.

Secondary Mathematics - Other Tests: The Mathematics (Adv.) 6 test intended for children aged 12y. 0m. - 13y. 11m. was given to one child but it was found to be less suitable (as it was a time test) than Basic Maths 'PG' (12y. 3m. - 14y. 9m.) which was intended for a wider age range and which formed part of the 'Basic Mathematics' series which had been used throughout the study.

A unit of the Secondary Mathematics Test Series B, designed for fourth year secondary pupils, was given to three boys who had scored highly on Basic Maths 'PG' but they were unable to work it as they had not covered the relevent syllabus material.

COMPARISON OF MEASURED INTELLECTUAL POTENTIAL AND LEVELS OF ATTAINMENT

The performances of the highly-able and average-bright control children have been compared in a number of different ways on each of the above tests to see what differences, if any, are present. Comparisons have been made between:-

(i) The main highly-able group and the control group;

(ii) Two sub-groups comprising those obtaining an I.Q. of 160 or over (to be known as the High I.Q. Sub-Group) and those scoring an I.Q. of 120 or less (to be known as the Low I.Q. Sub-Group).

(iii) Those subjects among the highly-able group who were nominated for inclusion in the sample as such by their teachers, and those who were identified by other means.

The following statistics have been used in subsequent calculation for each subject in the sample:-

1) Chronological Age at date of working attainment test,
2) Stanford-Binet Mental Age at date of working attainment test,
3) Standardised Score for each attainment test worked,
4) Educational Age for each attainment test worked.

From some combination of the above statistics, values have been calculated for each individual child on each attainment test worked as follows:-

a) Educational Quotients as the ratio of Educational Age to Chronological Age,
b) Educational Quotients as the ratio of Educational Age to Mental Age,
c) Gaps between Educational Age and Chronological Age, and
d) Gaps between Educational Age and Mental Age.

In the interests of clarity b) above will subsequently be referred to as the 'Achievement Quotient' and d) as the 'Achievement Index'.

For each of the reading, English and mathematics attainment tests previously listed, the mean and standard deviation of the distributions resulting from the groupings of children who worked the tests have been calculated in respect of all eight categories listed above. The 't' test has been used to calculate the significance of differences found between the highly-able and control group children in b) and d) above. Coefficients of correlation have been obtained between the indicators of potential ability and of attainment for the two main sample groups. These statistics have been examined to see to what extent they indicate any differences in the relationship between measured ability and achievement in the four sets of children.

A set of four tables has been drawn up in respect of the reading and English attainment tests listed earlier. The tables give the mean achievement ratios, the 't' ratios for the differences between the means and their statistical significance as follows:-

(1) For a comparison of each of the main sample groups as regards the means of the scores obtained for Reading, English A.2, B.2, C.2, D.2, separately,

(2) As above in (1) but for the High and Low I.Q. sub-groups,

(3) For a comparison of each of the main sample groups as regards the means of their combined scores for English A.2, B.2, C.2, D.2.

(4) As above in (3) but for the High and Low I.Q. sub-groups.

A similar set of four tables has been constructed in respect of performances in the mathematics tests.

Corresponding tables to the eight specified above have been drawn up showing the mean differences as regards the gaps between the obtained achievement indices, the 't' ratios for such differences and their statistical significance.

Tables have also been constructed comparing the significance of differences in the mean achievement quotients and indices gained by three sub-groups of the highly-able group differentiated according to the method whereby the subjects were nominated. Diagrams have been used to illustrate some of the information given in tabular form.

The calculations were carried out on the computer at Hatfield Polytechnic. Packages were used to find 't' and chi-square values, regression lines and the coefficients of correlation. As an example, details of the first of these programmes is given below:-

Language: R Basic Library Ref.: Stat03(200,200)

Source: Thomas E. Kurtz, Kiewit Computation Center.

Description: "The program computes the Mean, Variance and Standard Deviation for each of two variates. Proceeds to compute the difference of the Means, the Variance and Standard Error of the Difference of the Means and the t-ratio (difference of Means) with the appropriate number of Degrees of Freedom. Note:- this program assumes variates have unequal variances".

The probability level of obtaining the 't' ratios given in the print-out, with the relevant number of degrees of freedom, have been obtained from the appropriate published statistical tables. An electronic calculator was used to check the correctness of the data input.

THE QUESTIONNAIRES

Three questionnaires have been designed for completion by the sample children, their parents and teachers, the three parties most concerned with the children's development. This part of the research enquiry is aimed at supplying background information concerning the children's environmental situation, and as to the opinions held by the three interested parties regarding it and other relevant preferences.

The children's, parents' and teachers' questionnaires have been drawn up on broadly parallel lines so that particular features of the children's circumstances might be considered as seen from the viewpoints of the respondents.

The replies given in the completed questionnaires have been compared as between those relating to the highly-able and the control group pupils. A comparison is made between the answers given to each of the questions in turn, the chi-square test being used to provide a measure of the statistical significance of differences in the content of the responses. The two sets of children's, parents' and teachers' completed questionnaires have been examined sequentially.

An indication of the reliability of the answers given on the parents' and teachers' forms is provided by a factual question on the amount of a child's absence from school which has been included on both questionnaires; requests for other factual information as regards age, sex, etc. have also been duplicated.

Finally, the responses given in the two sets of three forms as a whole have been taken to sketch stereotype portraits of an intellectually highly-able as compared to an average-bright child.

Information from the completed questionnaires has been presented in tabulated and diagrammatic form.

Children's Questionnaires

Different, although similar questionnaires, have been completed by the Infants and the Junior School children. In the case of the Infants, the form was completed by the investigator during the course of an interview with the child and the questionnaire itself is simpler and more limited in nature. The Junior children completed the forms themselves.

The children's completed questionnaires have been examined as regards:-

(a) In connection with his/her attendance at school:-
    (i) The rating the child gives on a five-point scale as to the extent he likes, or does not like, school.
    (ii) The part of the day he/she prefers at school.
    (iii) The way he/she likes working best at school.
    (iv) The child's preference for a particular part of the school curriculum.

(b) Whether or not the child would prefer to be somewhere else, other than school, during school hours.

(c) The child's social relationships:-
    (i) With other children.
    (ii) With older children or adults.

The children's answers relating to (a) (i) the degree of liking for school, have been compared with their replies to (b) their preferences for being elsewhere during school time, in order to gauge the consistency of their answers.

The replies have been examined to see the degree of agreement between the child's own stated preferences for particular parts of the curriculum and for specific activities at home and the parents' stated beliefs about their child's preferences. Similarly, the child's own views about his friendships and social relationships have been studied in relation to views about his friendships expressed by his teacher and his parents.

Parents' Questionnaire

From the questionnaires completed by the parents information has been collected regarding:-

(1) A rating on a five-point scale, as to the extent parents considered their off-spring liked school.

(2) Parents' opinions as to which part of the school curriculum their child preferred.

(3) Whether or not their child had been taught school subjects at home.

(4) An opinion about their child's popularity with other children, i.e., the peer group.

(5) The manner in which their off-spring preferred spending his/her time while at home.

(6) The amount of absence the child has had from school during the past year.

Teachers' Questionnaire

The completed teacher questionnaires have been used to compare the two groups of children in respect of the teachers' views:-

(a) On a five-point scale for each of:-
    (i) The child's age compared with the average age of the class as a whole.
    (ii) The standard of work performed.

(b) Regarding the child's academic work:-

    (i) The strongest area of the curriculum.

    (ii) The weakest area.

(c) Concerning the child's achievement in, and attitude towards physical activities such as sport.

(d) A rating of a child's standing with the peer group.

(e) The amount of absence from school.

SUMMARY

The methodology of the present study has been to take two samples of children, selected on the basis of I.Q., and to compare the results of their performances on a reading test, and a series of mathematical and English attainment tests. Additional information regarding both samples has been obtained by the use of three questionnaires and this has been used to build up a generalised picture of the children concerned. Tables, statistical diagrams, chi-squares and 't' tests of significance and correlation coefficients, have been used in the analysis of the information collected.

CHAPTER V

PRESENT STUDY: PROCEDURES

THE SAMPLE

For the purposes of this study, 174 children, 116 boys and 58 girls were tested, or a pre-existing test score obtained for them, on the Stanford-Binet Intelligence Scale (1960) Revision. The procedure adopted, the results of which are shown in Figure 5/1, was to locate a supposed Highly-Able nominee and then to seek a pairing Control child named by the same school.

It may be seen that the proportion of boys to girls included in the study is in the ratio of 3 : 2. A similar disproportion in the sex distribution of the sample is shown by the 831 boys to 613 girls making up the 1,444 subjects of Terman's 'gifted group' (Terman, 1926, Vol.I, p. 39). The American study accounts for part of this variation between the sexes as due to the high number of male births: in addition, consideration is given to the possibility of bias in the Stanford-Binet test such that boys are favoured by this instrument as compared to girls. However, a similar phenomenon is referred to by Prof. Tempest (private correspondence with the present author, 1976), who reports that a similar discrepancy was found among 'gifted' children in the Liverpool project. Tempest states that the reason for the imbalance is unknown and he, too, suggests the disproportion might be the result of the test used. It may be noted, however, that in the Liverpool study the W.I.S.C. and not the Stanford-Binet was the instrument in question so that should this explanation be accepted the implication is that both these intelligence tests favour 'gifted' boys as against 'gifted' girls.

HIGHLY-ABLE GROUP

Ninety-seven children were nominated as probably having an I.Q. of 140 or over, of whom 73 have been included in the present sample. The source and distribution of the candidate children are shown in Table 5/1.

TABLE 5/1 SOURCE OF NOMINATION OF SAMPLE CHILDREN

Nomination by:	SAMPLE		TOTAL
	Included	Not Included	
Parents	13	8	21
Teachers	37	16	53
Psychologists	22	-	22
Misc.	1	-	1
TOTAL	73	24	97

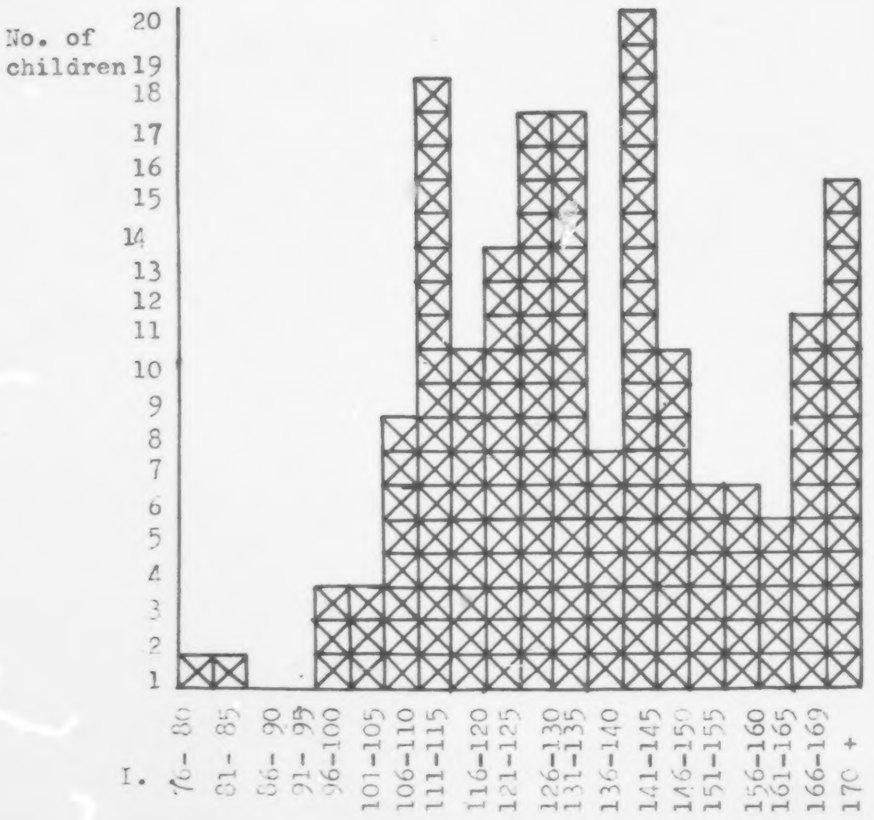
The children initially included in the sample were those of members of the National Association for Gifted Children, and agreement for a child's participation was sought first from the child's parents and subsequently from the school. It was explained that the pupil would be given an intelligence test, attainment tests in Mathematics and English and would be asked to complete a questionnaire. There was ready agreement to these requests, most of the parents remarking that their child would enjoy participating.

FIGURE 5/1

THE TOTAL GROUP OF 174 CHILDREN

I.Q. SCORES ON STANFORD BINET

INTELLIGENCE SCALE



The parents were then asked to complete a questionnaire too and for permission to approach the pupil's Head Teacher in order to request the completion of a Teachers' Questionnaire. Several parents hesitated about the latter request and were reluctant to give permission for the school to be contacted lest by taking the initiative in allowing their off-spring to be included among a sample of Highly-Able children resentment was caused at the school, which in turn, might be reflected in the teacher's treatment of their child. Reassurance was given to the parents on this issue, it being pointed out that teachers were a professional body of people with a very real concern for the welfare of their pupils who would not react against a child. Although it became apparent that in a minority of cases a state of tension did exist between the parents and the school, no parent withheld consent that their off-spring's Head Teacher should be approached and accordingly supplied the name and address in question. The parents were assured that all the completed questionnaires would be treated with strict confidence and that no information given by themselves would be passed to the school, but nor would any comments made by the school be conveyed in the reverse direction. A guarantee was given that in the final report strict anonymity of all those participating would be observed. When the families were visited the children were not present as there was no need to involve them in the discussions.

Several Child Guidance Clinics and individual psychologists were approached for candidates for inclusion in the Highly-Able sample. As a result, ten children were included in the sample after the parents had agreed that the children should participate and had given their permission for the relevant intelligence test scores to be made available for this purpose. The remaining twelve children were discovered accidentally by one or other of the psychologists undertaking the testing in the schools for the present study.

It seemed desirable that examining with the Stanford-Binet Intelligence Scale should be undertaken independently by a psychologist experienced in testing as the scoring would involve children over two standard deviations from the Mean, and as the intelligence test scores were of fundamental importance to the study. Mr. M. Argent, a post-graduate student in the Department of Psychology at Imperial College, himself undertaking research involving intelligence testing, administered the Terman-Merrill Intelligence Scale to over half the Highly-Able and over three-quarters of the Control children, the greater part of the remaining testing being conducted by a retired Senior Educational Psychologist - the examination of the remaining few subjects, except for those of the Highly-Able for whom pre-existing test scores were available, was undertaken by a third psychologist. With isolated exceptions all the testing was conducted in the children's schools and in most cases the pairs consisting of one Highly-Able and one Control child were tested by the same psychologist.

Figure 5/2 shows the distribution of the I.Q.s obtained for the 97 Highly-Able candidates according to the Terman-Merrill Scale. Twenty-two pupils were omitted as they failed to reach the 140 I.Q. cut-off point, three gaining an I.Q. of between 110 - 119, and one an I.Q. of 100. Two children with an I.Q. of 140 and 165 were excluded as the schools were unwilling to co-operate and this precluded the selection of a suitable Control child to make the pair. The distribution of these 24 children is shown in Figure 5/3.

FIGURE 5/2

97 CHILDREN NOMINATED AS HIGHLY-ABLE

(includes 12 Ex-Controls)

DISTRIBUTION OF I.Qs. (STANFORD BINET)

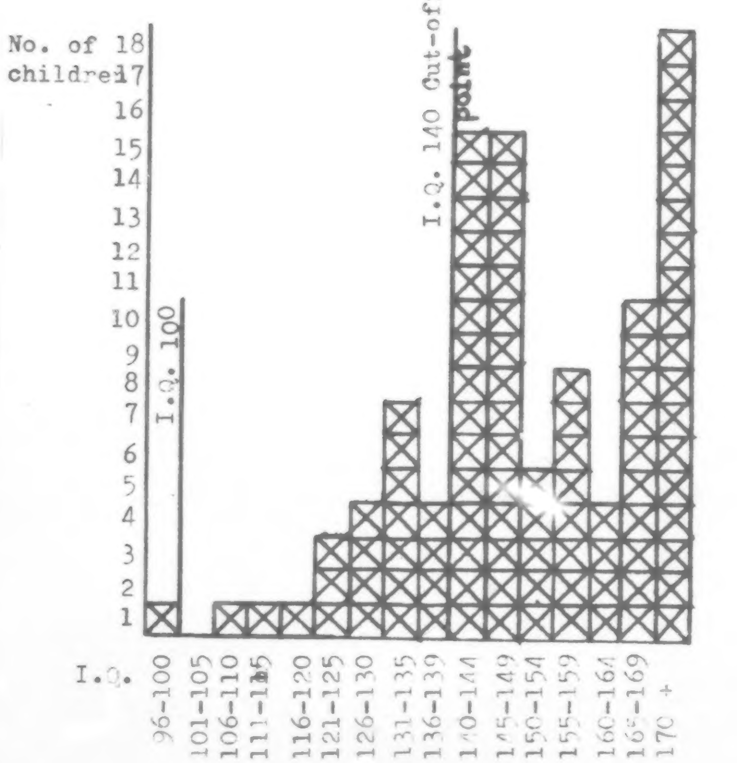
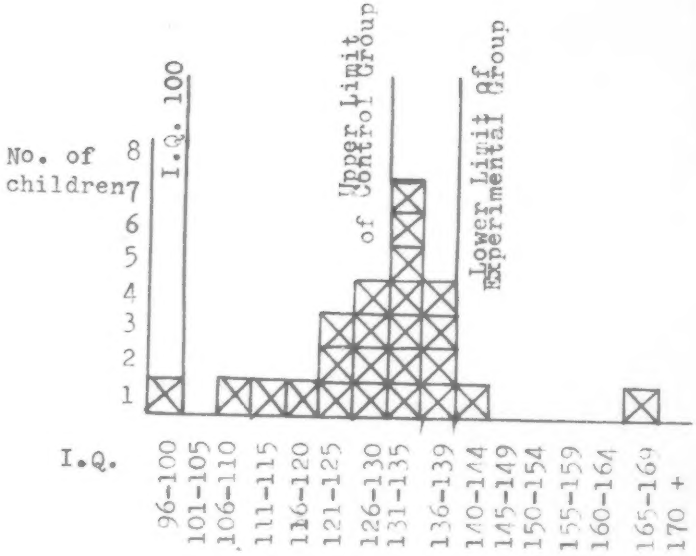


FIGURE 5/3

DISTRIBUTION OF I.Qs. OF 24 CHILDREN

EXCLUDED FROM HIGHLY-ABLE GROUP



THE SCHOOLS: A visit was made to the Head Teachers of the nineteen schools which had been named, in order to explain the nature of the research project being undertaken and to ask for their co-operation. During the interview most of the Heads enquired why their particular school had been selected. They were informed that a pupil in their school was a candidate for inclusion in the Highly-Able sample and that the child's parents were willing for their off-spring to participate in the study. The Heads were asked if they would arrange for the Teachers' Questionnaires to be completed so that the school's view on the child concerned could be obtained, it being made clear, as had been done with the parents, that no information from the Teachers' Questionnaire would be conveyed to the parents, and similarly no comments made on the Parents' Questionnaire would be passed to the school. The great majority of the Heads were quite willing to co-operate in this way. Nothing further was asked from the first few schools approached and the interview terminated with an expression of appreciation for the school's co-operation. During the discussion, almost without exception, the Heads expressed an unexpected interest in the study, a number of them remarking that it was time some investigation was undertaken into the progress of the brighter children.

As the research work proceeded, it was found necessary to ask the schools for more extensive co-operation as follows:-

(1) To select a pairing Control child who was of normal ability, but who otherwise matched the Highly-Able child on five counts:-

    (i) Sex,
    (ii) Same school class teacher and/or school teaching unit,
    (iii) Similar social status of parents,
    (iv) Comparable economic background,
    (v) Same chronological age.

(2) To write to the parents of the Control child, stating that a research study was in progress regarding the levels of children's attainment relative to their ability which would involve individual pupils doing some tests in school and asking the parents' agreement that their child should participate.

(3) The school to send the Parents' Questionnaire to the parents concerned, together with a stamped, addressed envelope addressed to the author for the return of the completed form. This procedure allowed the parents to return the questionnaire direct without its contents being communicated to the school; it also relieved the author of the necessity of having direct contact with those parents involved through the school.

(4) To allow the psychologist to visit the school in order to administer the Stanford-Binet test to the children concerned.

(5) To allow the researcher to visit the school twice in order to give the children the appropriate NFER Mathematics and English Attainment Tests.

Fifteen of the nineteen schools originally approached via the parents of presumed Highly-Able children agreed to this procedure, and both the Head Teachers themselves and their staffs, were most co-operative. In six cases the Heads expressed surprise at the names of the candidate Highly-Able pupils, four of whom had been suggested by their own parents, and two by educational psychologists. In seven schools the Heads offered one or more additional pupils and these Highly-Able candidates were accepted without hesitation.

After discussion, it was decided that a standard letter should be sent to all the parents whose children were to be invited to participate in the project and that no indication should be given in the communication that the study was one concerned specifically with Highly-Able children, so avoiding stating whether a particular child was to be included as one of the Highly-Able Group or as a pairing child. Similarly, in the course of the actual testing of the children, no distinction was made between the two groups and where, as in a number of schools more than one pair of children participated, a small group of children was involved although usually drawn from more than one of the school's classes.

Ten schools were contacted as a result of an initial introduction from a teacher and in four of these a member of staff knew of a candidate pupil. Each of these schools was visited and the procedure was similar to that already outlined. Another two were infant schools suggested by the Heads of the Junior Schools with which they were associated; two other Junior Schools into which pupils had passed from the feeder infant school before the testing had been completed; two more were contacted following an introduction to their Head by a Lecturer in Higher Education. An eleventh school - sited in the Midlands - was introduced through the good officies of another primary school Head in that area.

In the case of four schools, the Local Child Guidance Office was the channel through which the link was established, a fifth school in Wales was involved through the good auspices of a psychologist. Only in this latter school, and in the one in the Midlands, was the work not carried out personally by the researcher.

Altogether 39 primary schools were contacted of which 33 cooperated in every way in which they were asked; in addition three secondary schools assisted by allowing children who had moved into their schools from the 'Top Juniors' of their Primary Schools before completing all the tests, to do these during the first weeks of the Autumn term.

Six primary schools visited, did not participate in the project. The Heads of two of these schools, in both of which a Highly-Able pupil was already known, when visited, agreed to co-operate but permission for them to do so was refused by their Local Education Authority; hence these children could not be included in the study. The remaining four non-participating schools were spread over four L.E.As. Of these, one Head Teacher agreed to participate provided all the pupils were involved in any one school class but would not agree to the selection of two or four children according to the specified requirements of this research. Since the resources available would not allow the testing of all the children in one class, the school's offer had regrettably to be declined. Another Head Teacher agreed to complete the Teacher's Questionnaire but was not willing to select a pairing Control child from among the other children in the Highly-Able pupil's class. The parents of this child were among those initially involved and the Stanford-Binet test had been given in the child's home before the school was contacted but the individual had to be excluded from the Highly-Able sample since there was no pairing Control child. A similar situation arose in a third school with a further pupil. In the latter case the Head expressed strong opposition to the whole concept of the research study; it was the only school where such a view was put forward among the total of 43 schools approached. The two children shown on Figure 5/3 as being excluded from the Highly-Able sample, although they obtained an I.Q. score above the cut-off point, attended the latter two schools discussed. Lastly, one school had just moved into new buildings.

Its Head Teacher agreed to participate the following term but by that time the field-work in the other schools was complete so his school was not re-visited.

Two of the participating schools changed their Head Teachers while the testing was still in progress. In the first case the new Head expressed willingness to continue the school's participation in the research work and, like his predecessor, rendered all possible help. In the second case, the new Head Teacher refused even to grant the researcher an interview although work with children in the school was in progress and information regarding it had been passed on by the previous Head. In these circumstances arrangements were made for the children to complete the work (which involved working through some of the attainment tests) in the home of one of the participants.

The above procedures resulted in 73 Highly-Able children being included in the sample.

THE CONTROL GROUP

As previously stated, in order to have a measure of the degree of achievement relative to the measured intelligence of the Highly-Able children, a group of Control children of average ability and with the same background was required for comparison. The 33 participating schools nominated 98 Control candidates between them; the form of the involvement of these pupils is shown in Table 5/2.

TABLE 5/2 Composition of Group of 98 Control Candidates

	Number
Originally Nominated Controls in Sample	55
Replacement Controls " "	9
Controls scoring I.Q. 130-139 (inclusive) not included in Sample	13
Ex-Controls included in Highly-Able Sample	12
Controls not tested as candidate Highly-Able partner below I.Q. 140 cut-off point	9
TOTAL	98

The distribution of the I.Qs. gained by the 89 children who were tested (nine omitted, see Table 5/2), is given in Figure 5/4.

The most unexpected feature of the I.Q. distribution of the Control children was the high I.Q. values scored by a large proportion of children selected by their teachers as of average ability. Thirteen children who gained I.Qs. ranging from 131 - 139 inclusively were excluded from the sample in order to increase the contrast between the two Groups. The nine untested Control children were the partners of Highly-Able candidates who failed to reach the 140 I.Q. cut-off point.

An important sub-group are the twelve Ex-Control children who obtained an I.Q. of over 140 and who were subsequently transferred into the Highly-Able Group; they are included in Figure 5/4 and are shown separately in Figure 5/5. Replacement Controls were sought, for the twenty-five candidates who had to be excluded on account of their high I.Q. score, by repeated visits to the schools concerned. The investigator explained the position to the Head Teachers who nominated further pupils. These were subsequently

FIGURE 5/4:

DISTRIBUTION OF I.Qs. OF 89 CONTROL CHILDREN NOMINATED AS OF AVERAGE ABILITY

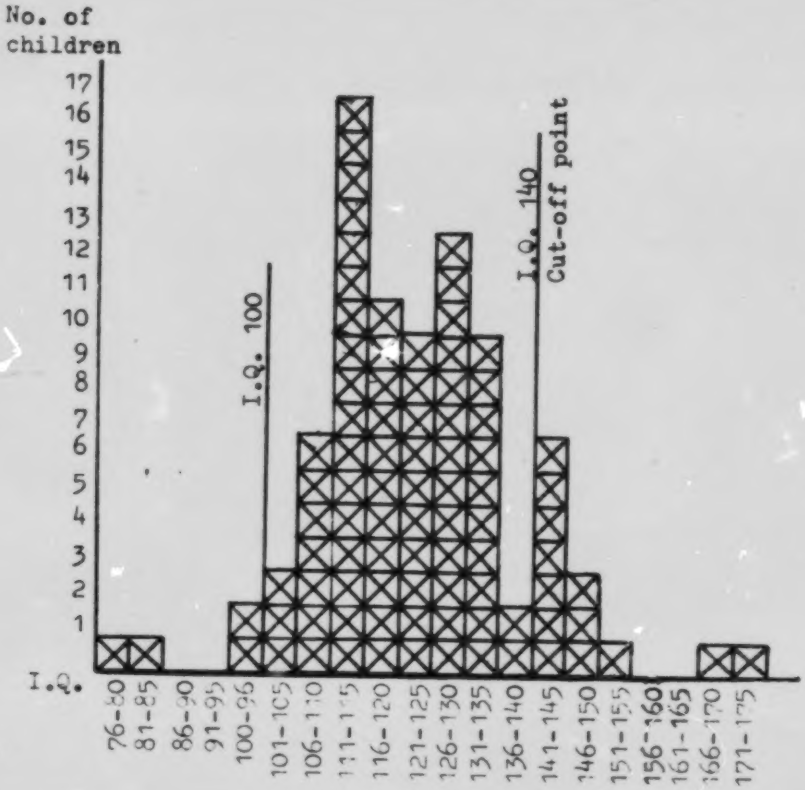
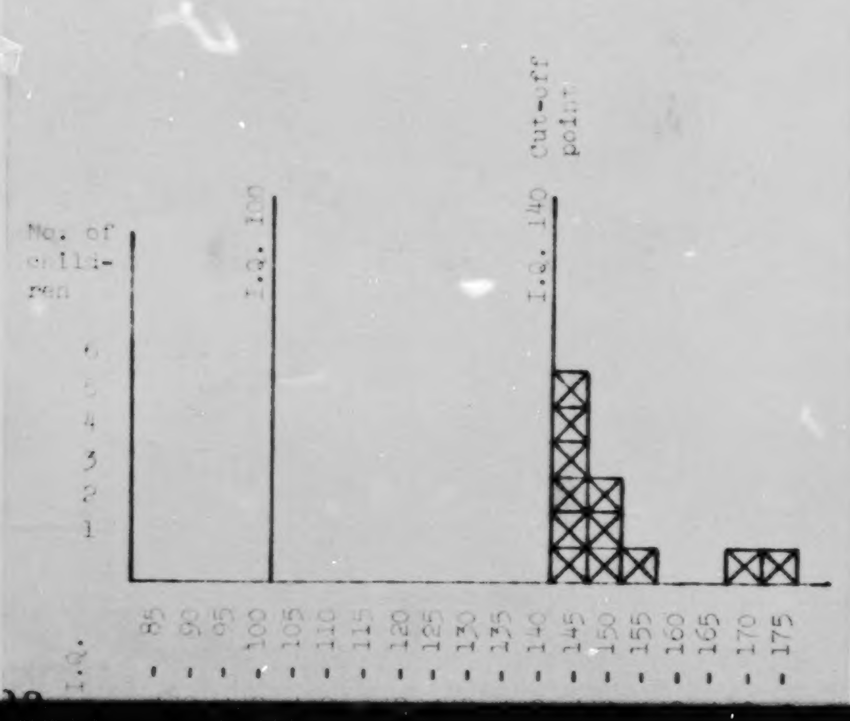


FIGURE 5/5:

I.Q. DISTRIBUTION OF 12 EX-CONTROL HIGHLY-ABLE CHILDREN



tested on return calls by the psychologist. Nevertheless a pairing Control child was not found for a number of the transferred Ex-Control children nor for some others already in the Highly-Able Group. However, it was considered to be important to retain the Ex-Control children in the study as these had been discovered accidentally although this resulted in a Highly-Able Group larger in number than the Control Group - the remaining unpaired Highly-Able pupils were also retained. The result has been a Highly-Able Group numbering 73 and a Control Group of 64 children.

The happenings in three schools are recounted as examples of those which led to this position.

In an infant school, the participation of two pairs of children had been agreed. The psychologist visited the school but when he tested the two candidate Controls he found that these pupils too had measured I.Qs. above the 140 cut-off point, one of them obtaining an I.Q. of 170+. The children had moved to a Junior School before further testing could be undertaken. An approach was made to the latter school where the Head Teacher agreed to participate in the work, the request being made in this second school was only for four Control children in the school classes to which the original four had been allocated. Further candidate controls were provided but when these four Controls were tested it was found that one of them too scored above 140; it was necessary to return to the school once more - this time to ask for two more Control children. These the Head Teacher again provided. As a result five pairs of children were located in two school classes; no attempt was made to find other Highly-Able children in other parts of this school.

A similar situation arose in a second school where the I.Q. testing was undertaken by a different psychologist. Originally it had been suggested that four pairs of children should participate. When the Stanford Binet Test was given, it was found that the Control candidate of one pair gained an I.Q. of 143 while the nominated Highly-Able child obtained an I.Q. of 128. Accordingly, the two children were changed round and added to the appropriate groups. In a second pair, the Control child scored in the 130s and so could not be included in the Control Group. The Head Teacher obtained permission from the parents for the participation of a replacement Control child but upon testing it was found that this latter child gained an I.Q. of 146 and accordingly he was included in the Highly-Able sample. The Head Teacher was approached once again, this time for two more Control children, for the unsuccessfully replaced pupil and now, in addition, for the replacement as well. The school had no more children who matched on all the five pairing points and accordingly a Control child had to be included who was of a different sex from the Highly-Able partner. This was the only time the sexes were mixed in the pairing arrangements.

In the third school there were originally two pairs of children, One of the Highly-Able had already been tested by another psychologist at the parents' request, and the second candidate was nominated by the school, which also arranged for the necessary two control children. When the psychologist tested the three children it was found that they all obtained I.Qs. in the 130s. This meant that the Control child for the established Highly-Able child had to be replaced, while neither of the second pair of children was eligible for inclusion in the research study in either capacity. The school was then asked to find another replacement Control child. These procedures took some time and the summer vacation had already commenced before it was possible to test the last replacement

Control candidate. The parents of this latter child were visited and agreed that the psychologist should go to their house to carry out the Stanford-Binet test. In the course of conversation the mother made the unexpected, and in this particular case somewhat unwelcome remark, that she had always known the child was highly intelligent. Neither of the two psychologists who had undertaken the other tests were available during the summer break, and accordingly a third examiner was involved. The I.Q. score obtained by this child was 141 and so another addition was made to the Highly-Able Group. This child, and the now unmatched Highly-Able pupil, had both been in the top Junior class of the Primary School so that they were entering secondary schools the following term. In these circumstances, it was not possible to obtain further Control children for them so they have been included in the Highly-Able sample without pairing partners.

As may be seen from above, the complications that ensued as a result of participation in this study involved some of the schools in far more extensive and protracted arrangements than had originally been anticipated by the author, and far in excess of the original co-operation agreed by the Head Teachers concerned. The tremendous contribution that has been made to this work by the patience and unlimited help given by the schools is worthy of special note. In a number of the other schools, too, similar problems were met and extra requests had to be made. In all cases the Head Teachers, and their staffs, of the co-operating schools continued to give willing assistance (with the exception of the school with the newly appointed Head mentioned above,) until the work was as far as possible complete. One point which has been underlined by the location of the Highly-Able children has been their irregular distribution among different primary schools. While in the three mentioned above an unexpectedly large number of Highly-Able children were found, in two schools none were identified by the methods adopted.

An attempt was made to increase the number of working-class children in the sample by the inclusion of two schools catering mainly for such pupils but none were found. In the first, four children were put forward including a pupil who was a disciplinary problem (he participated with zeal in the research tests) but all four scored I.Qs. between 125 and 129. The second was a school in an industrial area. An opportunity to involve such a school presented itself and it was felt by the investigator this should not be missed. The Head Teacher concerned agreed to nominate a Highly-Able and Control pupil and arrangements were made with the Educational Psychologist at the local Child Guidance Clinic to test both children. The Highly-Able candidate scored an I.Q. of 100 and the psychologist commented in his report:-

> "I am at a loss to discover why this child was thought to be of superior intellectual function, except perhaps that he is a conforming and rather polite boy in a school where such children are at a premium".

The sample pupils attended 33 different primary schools, Junior Mixed Infant Schools, separate Junior Schools and Infant Schools. The subjects were distributed among the participating schools as shown in Table 5/3 from which it can be seen that there was a large variation in the number of children contributed per school.

TABLE 5/3 **Spread of Sample among Participating Schools**

No. of Children	No. of Schools Contributing:
15 - 16	1
13 - 14	-
11 - 12	-
9 - 10	1
7 - 8	3
5 - 6	7
3 - 4	7
1 - 2	10
-	2
TOTAL	31

Note: Two schools less than 33 involved as pupils changed schools.

Table 5/4 shows the participating schools according to the Authority responsible for their organisation. As can be seen from this table, both Protestant and Catholic Voluntary Aided and Controlled Schools were included in the Study; By such inclusion it was hoped to gain a wider experience of the existence of, and of the possibilities of identifying, Highly-Able pupils

TABLE 5/4 **Distribution of Sample by Type of School Authority**

Type of Authority	No. of Schools	No. of Highly-Able Children	No. of Control in Schools	Approx. No. on Roll
County Pr.School	27	60	51	8,000 est.
Voluntary Aided or Controlled				
(i) Protestant	4	8	8	792
(ii) Catholic	2	5	5	446
TOTALS	33	73	64	9,238 estimate

in schools administered variously. As can be seen from Table 5/4, the proportions of Highly-Able children identified to roll size of the participating schools, was roughly the same.

Table 5/5 classifies the schools according to the type of geographical area. 27 of the schools were sited in new or old urban areas and six in rural or semi-rural districts. The number of rural and semi-rural schools is too small for any meaningful figure to be obtained, but to the extent that it does give any information the indications are that about the same proportion of Highly-Able children are to be found in the rural and semi-rural areas as in the urban ones.

TABLE 5/5 **Distribution of Participating Schools According to Type of Area**

Type of Geographical Area	No. of Schools	No. of Highly-Able in Sample	No. of Control Children
Urban or Suburban	27	63	55
Semi-Rural	4	6	5
Rural	2	4	4

Table 5/6 shows the distribution of the participating schools and the number of the sample children in them according to their roll size.

TABLE 5/6 Distribution of the Sample Relative to the School's Size Roll Size

Roll Size of School	No. of Schools	Total No. in Sample Exp.	Control	No. of exp. teacher nominated	Total No. children in the school	Ratio
0-100	2	4	4	2	152	1 : 76
101-200	6	8	8	7	1051	1 : 150
201-300	16	47	43	23	4179	1 : 181
301-400	5	6	5	1	1820	1 : 1820
over 400	2	8	4	5	806	1 : 161
TOTALS	31	73	64	38	8008	

Note: Two schools less than 33 involved as pupils changed schools

The size of school was not one of the criteria upon which the sample was selected - nor was any screening device adopted aimed at identifying all the Highly-Able children in a particular school, with one possible exception. Yet among this particular group of 31 Primary Schools, Table 5/6 might be taken as indicating a tendency for the ratio of Highly-Able teacher-nominated children in the sample, relative to the number on the roll of the school, to be rather higher as the school becomes smaller. That such might be the case could be expected as in the smaller schools the probability is that in some of them the pupil-teacher ratio may be also less, and/or that the smaller school allows the Head to have a more personal knowledge of his pupils. Whether or not the chances of the school spotting the Highly-Able child is increased with a medium or smaller sized primary school is a hypothesis which might be investigated in a further research study in this field.

Characteristics of Sample

The final number of subjects included in the sample were:-

Highly-Able Group

Boys - - - 49)
Girls - - - 24) — 73

Control Group

Boys - - - 41)
Girls - - - 23) — 64

The chronological ages of the sample children at the time of their inclusion in the project are shown in Figure 5/6 and their measured ability in Figure 5/7. Their ages ranged from 5y. 7m. to 11y. 8m. inclusively. The I.Q. range for the 73 Highly-Able pupils was 141 - 213, inclusive, mean I.Q. 160, standard deviation 17.2; for the 64 Control children the I.Q. range was 80 - 130, inclusive, mean I.Q. 116, standard deviation 10.4. The distribution of I.Q. score for the sample children is shown in Figure 5/7.

FIGURE 5/6: CHRONOLOGICAL AGE DISTRIBUTION OF 137 CHILDREN IN SAMPLE

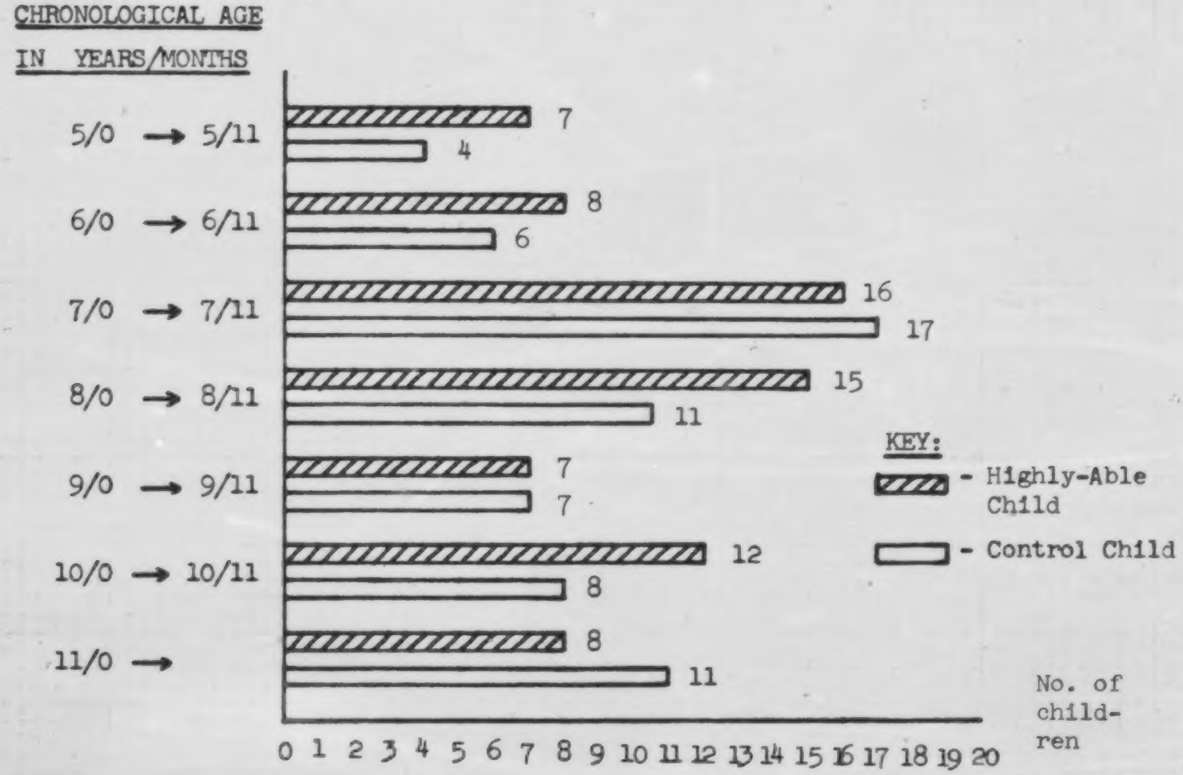
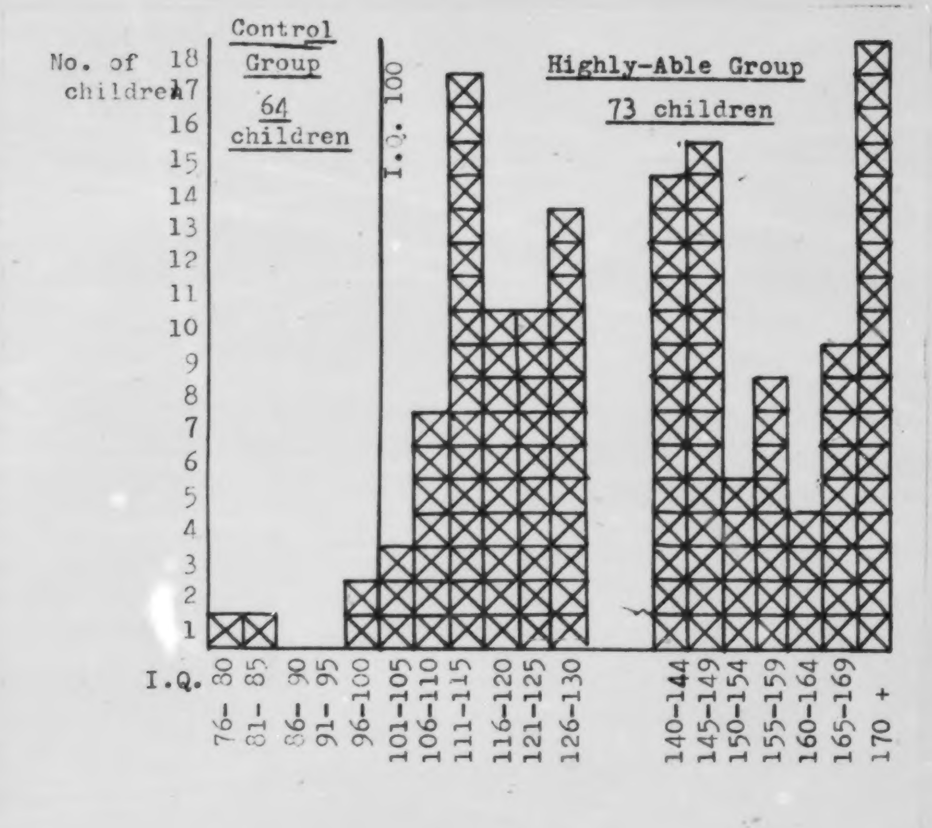


FIGURE 5/7

DISTRIBUTION OF I.Qs.
AS SHOWN BY
STANFORD BINET INTELLIGENCE SCALE
(1960 Revision)

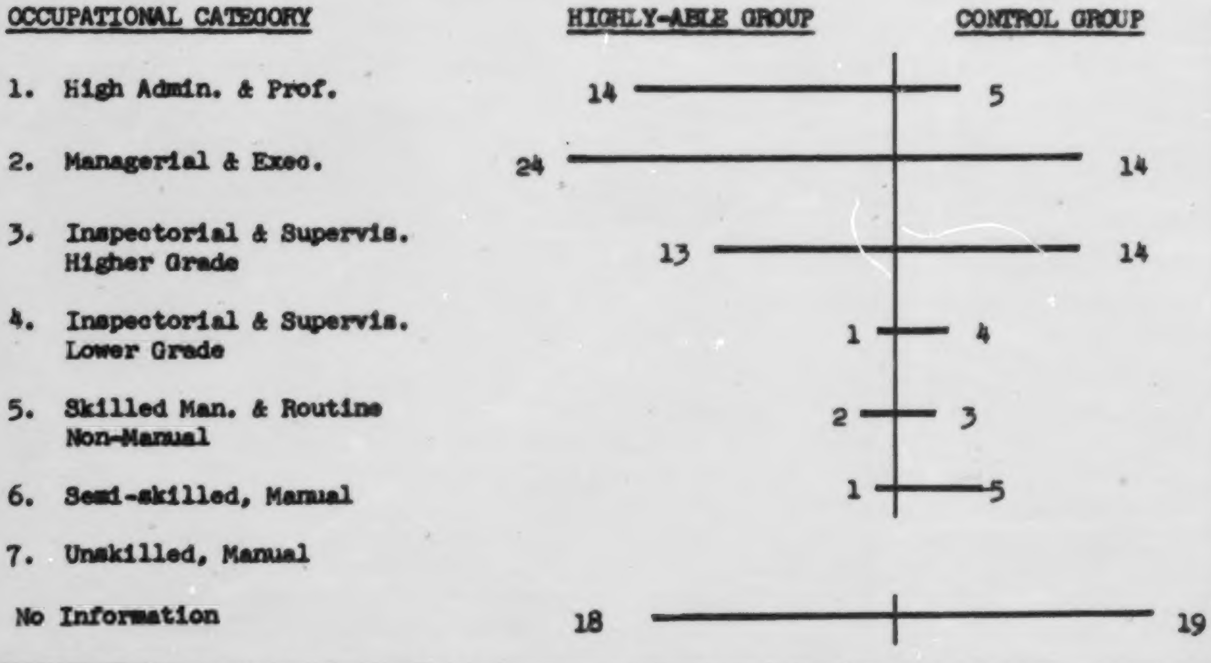


(Note:- Located among approximately
7,500 children)

Parental Occupations

The schools were asked the occupations of the subjects' parents in order to provide the basis for classifying the class background of the children. This information was not found to be readily available and while there had been ready co-operation in other respects, some of the Head Teachers were hesitant about supplying these data. In one school the parents' occupations were said to be unknown as there was no need for the particulars and the parents were not asked for them. Where information was available it was frequently vague and gave no indication of the responsibility level of the parent's employment. The current blurring of social class distinctions and the emergence of new skills and areas of technical knowledge has made it difficult to categorise occupations between social classes. However, an attempt has been made to show the socio-economic background of the present sample in Figure 5/8 using the material available and basing the grouping on the Standard Classification adopted by David Glass.

FIGURE 5/8 SOCIAL CATEGORIES OF SAMPLE PARENTAL OCCUPATIONS ON CLASS'S STANDARD CLASSIFICATION



TESTING IN THE PRESENT STUDY

Stanford-Binet Intelligence Test

Table 5/7 shows the conditions under which the intelligence score values were obtained. 60 Highly-Able and 64 Control children were examined on the Stanford-Binet Scale over a period of eighteen months solely for the purposes of this research study. Of the five tested at home two were among the earliest candidates who, as they had been nominated by their parents, were examined to see if they were eligible for inclusion in the Highly-Able sample before their schools were approached. In the cases of the other three, it was a matter of convenience to test them at home because of the intervention of the school vacation. The examination of these five children was carried out by two of the psychologists involved in the main testing programme. The great majority of the Highly-Able sample, 55 out of 73 children, were tested in school

TABLE 5/7 Manner in Which Terman-Merrill Intelligence Scores were Obtained

Manner in which IQ Score obtained	Highly-Able Group	Control Group
At home	5	-
At school	55	64
Previous score utilised	13	-
TOTAL	73	64

Note: 13 test figures obtained as follows:-

6 from psychologists who performed main testing in this study.

4 from Educ. Psy. attached to four different Child Guidance Clinics.

3 from two consultant psychologists.

as were all the 64 Control children.

The Simplex Group Screening

Screening on the Simplex Group Intelligence Test was carried out in one Junior school. From two to five pupils were drawn from each of the school's classes making up a total of 31 children. The Head requested the class teachers to put forward the names of those considered to be candidates for inclusion either in the Highly-Able Group or as a pairing Control child of average ability, for one of the prospective Highly-Able children. Where there was doubt as to which child to select both children were included in the screening group.

The Simplex Intelligence Scale was given to the 31 nominees as a group and no distinction was made between them according to the category for which they were thought to be candidates, nor was any difference made with regard to the separate school classes from which the children had been drawn. The results of the screening in relation to the Stanford-Binet Score are given in Figure 5/9 for the nine children tested on both instruments.

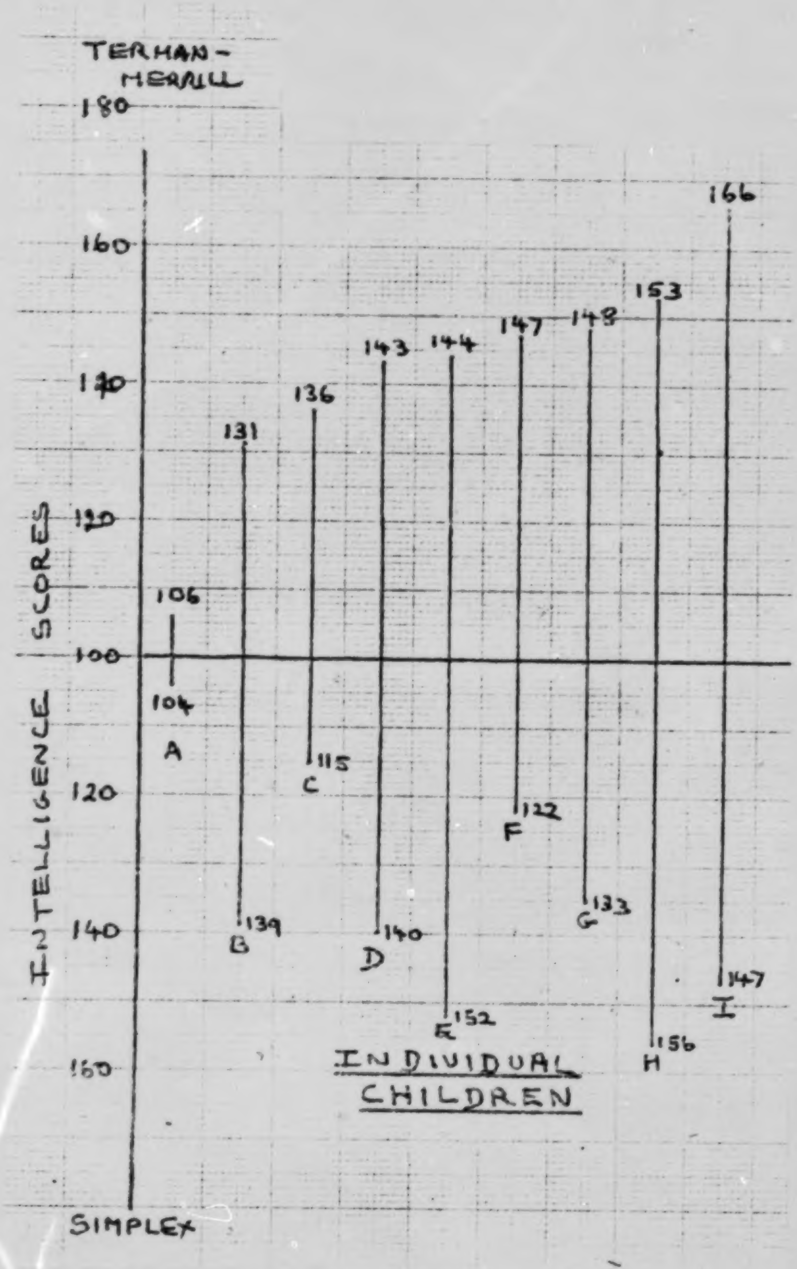
The Attainment Test:

All the Mathematics, English and Reading tests were given to the children by the investigator, with the exception of those worked by the pair of children living in Wales.

Great care was taken to ensure that the pupils had suitable environmental conditions for working the tests and that they were well-spaced out to ensure that each completed work-booklet represented the individual child's sole efforts. Often neighbouring children were working on different booklets since they were of various ages. It was explained to the pupils that a study was being made to see how well children were able to complete the booklets which had been

FIGURE 5/9

COMPARISON OF I.Q. SCORES OF 9 CHILDREN ON TERMAN-MERRILL AND SIMPLEX INTELLIGENCE SCALES



given to them, so that it was necessary for each one to work through the booklet by himself. This explanation was readily accepted by the children and furthermore, they showed keenness to take part in the project and pleasure at being in the group selected to work through the booklets.

Most of the booklets required about forty to fifty minutes for the juniors to work through, and about thirty minutes for the infants, but the tests had no time limit. The Maths and English Attainment Tests were given on separate occasions to ensure that the children were not tired or under any strain. The completed test booklets were subsequently marked by the investigator.

Plenty of time was allowed for the slowest of the children to complete the answers in the booklets when the questions were given orally in Basic Maths 'A' and 'B'. However, as some of the Highly-Able children were extremely quick, this meant that they had to wait while the Controls caught up. If a child showed signs of becoming restless he was given a piece of paper and encouraged to do some drawing until the next question was posed. Given below is a cross-word puzzle (Figure 5/10) which was made up by a seven-year old while the Control child was thinking out the answers during the course of the half-hour orally administered mathematics test.

Figure 5/10

I	T	▨	I
L	O	U	D
L	O	▨	E
▨	T	E	A

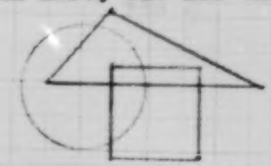
I see ——
opposite to well
You drink it
Opposite to hi
Horn makes it
You use it.

CROSS-WORD PUZZLE MADE UP BY HIGHLY ABLE BOY DURING WAITING TIME WHILE WORKING THROUGH BASIC MATHS "A".

Another example of the advanced level at which some of the Highly-Able children responded is given by the answer given to the following Basic Math 'A' question. The manual instructs the tester to read out the following question in relation to a diagram in the tester's booklet:-

> "Colour in the part of the diagram which is in the circle and in the triangle and in the square".

A drawing, as shown here, was all that was given in the children's test booklet:-



The Highly-Able child looked up and said, to make sure that he had understood:-

"In other words where all the shapes overlap".

He then proceeded to shade in the correct area. Since the phraseology was so unexpected in a child aged 7yrs. 3m. he was asked to write his comments in the answer book which he did, spelling all the words correctly. Subsequently he worked through Basic Maths Test 'B' designed for children aged 8 - 9 yrs. and obtained a Raw Score of 39 out of 40. Five months later, when he was 7yrs. 8m. he was given Basic Maths Test 'C' designed for children aged 9yrs. 7m. to 10yrs. 10m. and obtained a Raw Score of 41 out of a possible 50.

The total number of attainment tests worked, and their distribution among the nine N.F.E.R. tests utilised, specified in the previous chapter, is shown in Table 5/8 below. All the tests were marked and checked by the investigator, and particular attention was given to the accuracy of dates of birth and chronological age, since these, together with the raw scores, provided the basis from which the standardised scores and educational ages used in the calculations have been derived.

TABLE 5/8 Worked Attainment Tests

Attainment Test Title	No. Worked by Exp. Children	No. Worked by Control Children	No. Worked and Unused	Totals
ENGLISH TESTS				
Reading Test 'A'	17	15	12	44
English A.2	32	34	10	76
" B.2	17	11	4	32
" C.2	13	8	13	34
" D.2	18	13	10	41
" E.2	5	1	2	8
" F.2	1	-	-	1
MATHEMATICS TESTS				
Basic Maths 'A'	32	30	14	76
" " 'B'	12	10	-	22
" " 'C'	21	17	7	45
" " 'DE'	25	14	11	50
" " 'FG'	10	2	2	14
Secondary Maths	1	-	-	1
TOTALS	204	155	85	444

The difference in the number of scripts worked by children in the Highly-Able and Control Groups is the result of two factors:

(i) There were 73 children in the Highly-Able Group and only 64 in the Control Group.

(ii) Some of the very exceptional children not only worked the attainment tests designed for their own age groups, but as explained above (p.105), they also worked tests intended for older children.

The 73 unused tests are those which were worked by children, usually candidate replacement Controls, before the psychologist had given the Stanford-Binet test. Their subsequent measured intelligence score was such as to make them unsuitable for inclusion in the study.

THE CHILDREN'S QUESTIONNAIRES

In most cases the children completed these when the investigator visited their school to give one of the attainment tests. The questionnaire forms were similar, but differed in details between the infants and junior children.

The investigator explained to the junior children that she would like to know what they liked doing in school and what they thought about it generally. The children showed themselves quite willing to help in this way. The pupils' enquiries as to the meaning or intention of questions were answered but great care was taken in so doing not to influence in any way their answers.

Although many of the Highly-Able children among the infants could read fluently and were sufficiently confident to complete a questionnaire about their school activities, the same was not true of many of the Control Group. Accordingly, all the infant questionnaires were filled up in the course of an individual structured interview. The great majority of the questionnaires were completed by the child and investigator during the course of five to ten minutes; in some cases a similar procedure was followed but by the Head Teacher or the child's own class teacher.

As with the case of the attainment tests, no distinction was made between the children included in the two different groups of the study, and the children themselves were unaware that any division had been made.

A digest of the children's views as expressed upon the questionnaires will be found in Chapter 7.

Parents' Questionnaires: The parents' questionnaires, together with a covering letter and a stamped envelope addressed to the investigator for the form's return, were posted to the parents.

After a number of the completed questionnaires had been received back, it was considered desirable to revise the form. Parents who had filled in the original questionnaire were asked to complete the revised version as well.

Teachers' Questionnaire: A teacher's questionnaire in respect of each participating child was given to the Head Teacher of each school. Upon completion, the forms were passed back to the investigator.

SUMMARY

The procedures whereby the Highly-Able and Control Group children were incorporated into the study is described. The pupils were drawn from 31 primary schools - tables are given showing how the sample was distributed among the schools, the manner of the schools' administration, their pupil roll sizes and geographical location.

The chronological age range, sex distribution and I.Q. range of the 73 Highly-Able and 64 Control children in the sample are described. The distribution of parental occupations classified into social categories is given.

The condition under which the Stanford-Binet Intelligence test and the Simplex Group Intelligence test were administered is explained.

An account is given regarding the working of the attainment tests.

The distribution of the children's, parents' and teachers' questionnaires, and the manners in which they were completed are described.

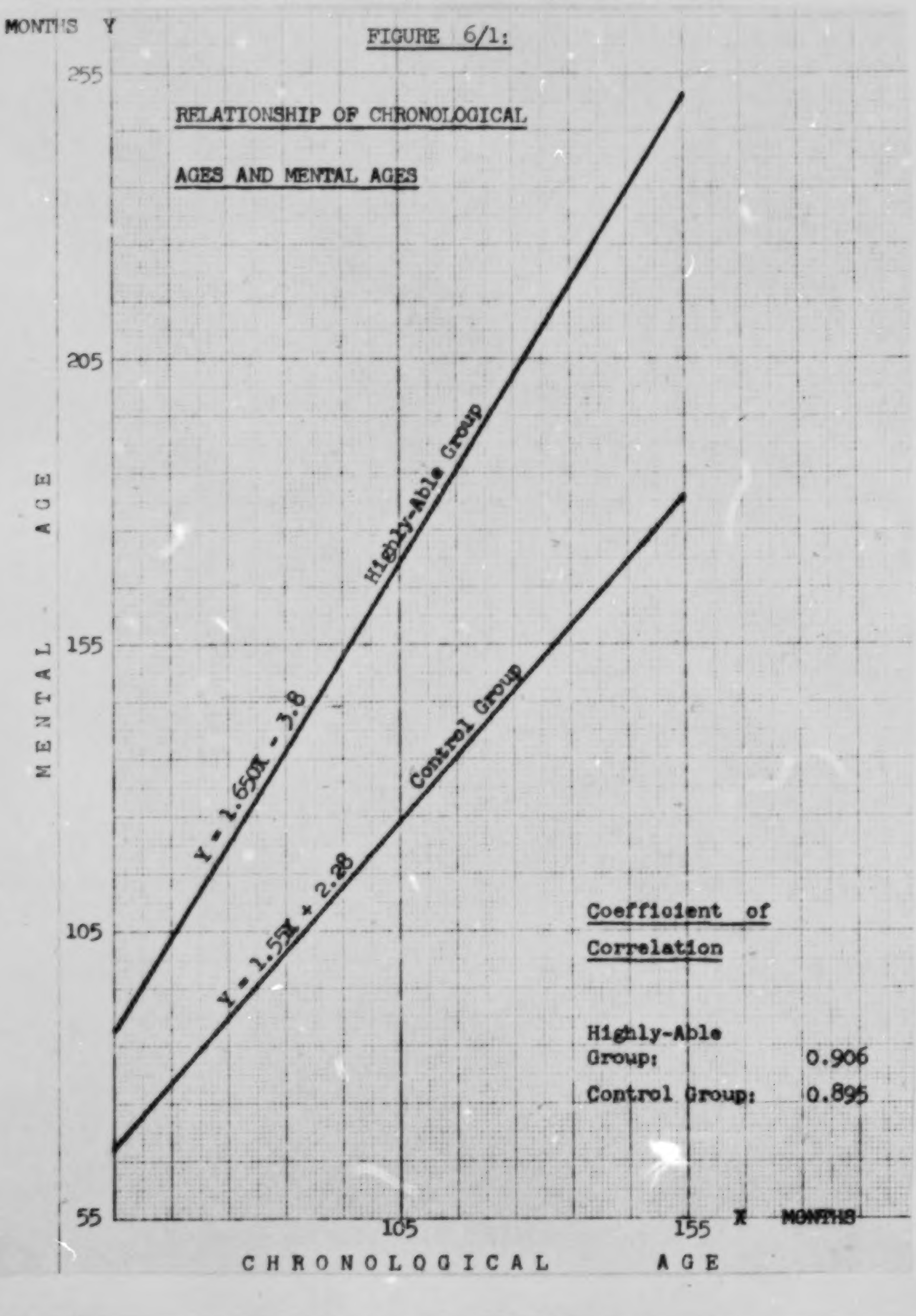
Chapter 6

RESULTS: 1 - MENTAL MEASUREMENTS

The relationships between Chronological and Mental Ages as given by the Stanford Binet Intelligence Scale for the Highly-Able and Control children are shown by the two regression lines

FIGURE 6/1:

RELATIONSHIP OF CHRONOLOGICAL AGES AND MENTAL AGES



given in Fig. 6/1 above. This shows an anticipated positioning of the two sets of relationships. The greater degree of measured intelligence possessed by the Highly-Able is depicted by the line representing that group cutting the 'Y' axis at a higher point than the corresponding line for the control group.

The correlation coefficients of Mental Age to Chronological Age for the two sample groups are as follows:-

Highly-Able Group	-	0.906
Control Group	-	0.895

The above indicate less scatter of the intersections about the regression line for the Highly-Able Group than for the Control Group but the difference in the correlations of 0.011 is well within the range of probable experimental error. The slope of the line for the Highly-Able group corresponds to the mean of 160 of the IQ distribution - the standard deviation for the latter being 17.2; the corresponding values for the Control group are 116 and 10.4. Although there is less scatter of the intersections for Mental Age to Chronological Age for the Highly-Able group, nevertheless the spread of the distribution of IQs is greater than in the case of the Control group.

Tables 'A' and 'B' in Appendix I give the Chronological Ages, Mental Ages, and the IQs of the Highly-Able and of the Average-Bright Control Groups respectively, from which the above regression lines and coefficients of correlation have been calculated. IQs above 170 have been arrived at as follows:- $\left(\frac{\text{Mental Age}}{\text{Chron.Age}} - \text{mean}\right)K + 100$, the values for the mean and K being supplied in published table (p. 389) of the manual for the Stanford-Binet Test, Appendix A.

NULL HYPOTHESIS

The null hypothesis tested were that, in respect of performances in reading, English and mathematics:-

> 'There is no significant difference between the mean values obtained for the relationships between the levels of ability and performance of the Highly-Able group and those of the Control group of children, according to the test used.'

The fore-going hypothesis has been tested as:-

(a) ratios between educational age and mental age - subsequently to be referred to as the "educational quotients".

(b) differences between mental age and educational age - subsequently to be referred to as the "index of achievement".

The sample groups tested were:-

(i) The entirety of those parts of the sample groups who worked each of the individual NFER tests in reading, English or mathematics, taken separately - subsequently to be known as the "Main Highly-Able Group" and the "Control Group".

(ii) As for (i) but in respect of two sub-groups of the samples only, consisting of those of the Highly-Able Group obtaining an IQ of 160 or over, and of the Control Group an IQ of 120 or under - subsequently to be known as the "High IQ Sub-Group" and the "Low IQ Sub-Group".

(iii) For the Main Groups for each of the combined English scores and the combined mathematics scores, the test series being taken as two separate units.

(iv) As for (iii) but for the High IQ and Low IQ Sub-Groups only.

(v) Three sub-groups of the Highly-Able Group distinguished according to the manner of their nomination, separate consideration being given to the values obtained on each of the NFER tests used.

Numbers of Worked Attainment Tests

Tables 6/1 to 6/7 below set out the relevant data for the Highly-Able and Control Group children who worked the reading test and the individual units of the English and mathematics test series.

It will be seen that in all cases the numbers of Highly-Able children tested are greater than for the Control Group. This may be accounted for by the following two reasons:-

1) The larger total number of children in the Highly-Able sample group, i.e., 73, as compared with the total Control group of 64 pupils.

2) Where individuals in the Highly-Able group obtained a raw score such that they reached the ceiling of the test for their own age group, the test designed

for the next older year-group was given. In isolated cases, the ceiling of the second test was reached also; in such cases, the test designed for the second older year-group was administered. This has meant that a number of the Highly-Able children have completed two, or even three, tests. Since none of the test scores obtained for English tests A.2, B.2, C.2 and D.2 have been omitted, where an individual (for the above stated reasons) worked more than one test, it follows that such a pupil's work enters into more than one of the results given in Table 6/2. The same procedure was adopted for the series of mathematics tests used. Overall, a total of 83 English tests were worked by the 73 Highly-Able children, whereas 64 tests were completed by the 64 Control children.

The reading test given is not part of the series of English language tests. It was given to the younger infants because some of the Control children were unable to score at all on the A.2 English test, and in this way it was possible to obtain a positive score for the Control children as well as for the infants in the Highly-Able group.

Reading Test

Reading ages for the sample infants have been obtained from the published tables in the reading test manual, or from calculated extrapolations therefrom. In the latter event, there is an increase in the probable degree of statistical error.

Table 6/1 gives the mean reading ages achieved by the younger infants. It will be seen that there is no significant difference in the relative values obtained for reading, whether the educational quotients or achievement indices are considered, and whether the groups compared are the Main Groups or the High and Low IQ Sub-Groups. When the quotients are calculated, the young Highly-Able infants are shown to be relatively more advanced at reading; when the achievement indices are calculated, there is only one month's difference between the mean values for the Main Groups but the gap between mental age and reading age has widened to four months when the High and Low IQ Sub-Groups are compared, the High IQ Sub-Group being the relatively further behind.

Accordingly, the null hypothesis (a) (i) and (b) (i) above in respect of reading cannot be rejected.

TABLE 6/1 NFER READING TEST 'A'
Statistical Significance of Differences in Mean Educational Quotients and Achievement Indices

GROUP	No.	Mean Chron. Age	Mean Mental Age	Mean Reading Age	QUOTIENT	Significance P<	INDEX	Significance P<
Main Highly-Able	17	6y 7m	10y 0m	8y 9m	87	-	1y 3m	-
Main Control	16	6y 7m	7y 8m	6y 5m	82		1y 4m	
High IQ Sub-Group	5	6y 3m	10y 6m	8y 9m	83	-	1y 9m	-
Low IQ Sub-Group	10	6y 9m	7y 7m	6y 2m	81		1y 5m	

English Attainment

English educational ages have been obtained from the printed tables of N.F.E.R. standardised scores, or in a minority of cases for both the Highly-Able and Control children, have been extrapolated from these. This has been necessary for the reasons already given (see p.152).

English Educational Quotients: Tables 6/2 and 6/3 show the educational quotients for the relative levels of achievement obtained on English A.2, B.2, C.2 and D.2 for comparisons firstly between the Main Groups and secondly the High and Low IQ Sub-Groups. Pairs of distributions in respect of each of the foregoing tests have been examined by use of the 't' ratio.

As may be seen from Table 6/2, there are no significant differences between the means of the distribution of achievement quotients for the Main Groups, although the values are lower for the Highly-Able Group in each of the four test units. However, the null hypothesis (a) (i), that there are no significant differences between the performances of the Highly-Able and Control pupils on tests A.2, B.2, C.2 and D.2 cannot be rejected.

Table 6/3 gives the corresponding data for the High and Low IQ Sub-Groups. The mean IQ of the 31 children in the Highly-Able Sub-Group is 176.4 (range 160 - 213), while the mean for the 41 pupils in the Control Sub-Group is 110.3 (range 80 - 120), a difference of 66.1 IQ points. When the data for the High and Low IQ Sub-Groups are viewed, the performances of the Highly-Able Sub-Group, relative to their ability, are significantly lower in three cases as compared with the Control Sub-Group, ($p <$ .01, .01, .05).

TABLE 6/2

MAIN GROUPS

Educational Quotients for English Language $(\frac{EA}{MA} \times 100)$

GROUP	TEST NFER ENGLISH	NO TESTED	MEAN CHRON. AGE	MEAN MENTAL AGE	MEAN ENGLISH AGE	MEAN $\frac{EA}{MA} \times 100$	't' RATIO	SIGNIFICANCE $p <$
Highly-Able	A.2	34	7y 0m	10y 11m	8y 11m	81	1.00	-
Control	A.2	32	7y 0m	8y 6m	7y 1m	84		
Highly-Able	B.2	17	8y 8m	14y 6m	11y 6m	80	1.46	0.2
Control	B.2	11	9y 1m	10y 9m	9y 1m	85		
Highly-Able	C.2	13	9y 6m	16y 3m	13y 3m	82	2,29	0.1
Control	C.2	8	10y 0m	11y 6m	10y 5m	90		
Highly-Able	D.2	19	10y 9m	17y 9m	14y 9m	84	0.40	-
Control	D.2	13	11y 4m	13y 3m	11y 3m	85		

TABLE 6/3

HIGH AND LOW IQ SUB-GROUPS
EDUCATIONAL QUOTIENTS FOR
ENGLISH ($\frac{EA}{MA}$ x 100)

GROUP	TEST NFER ENGLISH	NO. TESTED	MEAN CHRON. AGE	MEAN MENTAL AGE	MEAN NFER ENG.EDUC. AGE	MEAN $\frac{EA}{MA}$ x 100	't' RATIO	SIGNIFICANCE $p <$
Highly-Able	A.2	15	7y 1m	11y 11m	9y 2m	76	1.77	0.1
Control	A.2	19	7y 3m	8y 2m	7y 10m	85		
Highly-Able	B.2	9	8y 4m	15y 3m	11y 10m	77	3.48	0.01
Control	B.2	8	8y 11m	10y 2m	9y 1m	89		
Highly-Able	C.2	8	9y 4m	17y 4m	13y 2m	76	3.37	0.01
Control	C.2	6	10y 2m	11y 3m	10y 2m	91		
Highly-Able	D.2	7	10y 3m	18y 9m	14y 3m	76	2.71	0.05
Control	D.2	9	11y 3m	12y 7m	10y 10m	86		

Note:- HIGH IQ: Children scoring 160 or over on Stanford Binet.
LOW IQ: Children scoring 120 or under on Stanford Binet.

The null hypothesis (a) (ii) in respect of English language tests B.2, C.2 and D.2 for the sub-groups is therefore rejected. It is retained for test A.2.

Taking the individual tests of the English series separately has resulted in a limited amount of double-counting since several of the Highly-Able children reached the ceiling of the test intended for their age group and they were then given the test designed for children a year older. Extrapolation of the published tables supplied with the more advanced tests which such children worked had to be made to allow for the children's lower chronological age. In Table 6/4 the values are derived from only one test score per child, that for the highest level test which the individual child had worked. The few results gained for the highest level test worked, English E.2, have been included here. These scripts were too small in number to have been given separate consideration as was the case with the earlier tests in the series. The standardised scores obtained from the raw scores gained on each of the constituent tests in the English test series have been combined and used in the calculation of the mean educational quotients. As may be seen, the differences between the mean quotients for the Main Groups and for the High and Low IQ Sub-Groups are significant at the $p < .05$ and .001 levels, suggesting that it is unlikely that either of the two sets of distributions of quotients, which have been compared, are from the same populations.

On the basis of the above values, the null hypothesis (a) (iii) and (iv), in respect of the English test series taken as an entity, that there is no difference between the populations from which the

TABLE 6/4 **EDUCATIONAL QUOTIENTS** $(\frac{EA}{MA} \times 100)$

FOR COMBINED SCORES FOR ENGLISH SERIES A.2, B.2, C.2, D.2 and E.2.

GROUP	NO.	MEAN CHRON. AGE	MEAN MENTAL AGE	MEAN NFER ENGLISH AGE	MEAN RATIO $\frac{ENG\ EA}{MA} \times 100$	't' RATIO	SIGNIFICANCE $p <$
Highly-Able	73	8y 8m	14y 0m	11y 5m	82	-2.20	0.05
Control	64	8y 9m	10y 4m	8y 10m	86		
High IQ Sub-Group 160 & over	31	8y 5m	14y 11m	11y 5m	77	-3.82	0.001
Low IQ Sub-Group 120 & under	41	8y 10m	9y 11m	8y 6m	86		

TABLE 6/5 **MAIN GROUPS**

ACHIEVEMENT INDICES FOR ENGLISH LANGUAGE;

Mental Age less Educational Age

GROUP	NO.	NFER ENGLISH TEST	MEAN MENTAL AGE	MEAN ENG. EDUCATIONAL AGE	MEAN DIFFERENCE MA-EA	't' RATIO	SIGNIFICANCE $p <$
Highly-Able	34	A.2	10y 11m	8y 11m	2y 1m	2.26	0.05
Control	32	A.2	8y 6m	7y 1m	1y 5m		
Highly-Able	17	B.2	14y 6m	11y 6m	3y 0m	2.69	0.02
Control	11	B.2	10y 9m	9y 1m	1y 8m		
Highly-Able	13	C.2	16y 8m	13y 2m	3y 1m	3.33	0.01
Control	8	C.2	11y 6m	10y 5m	1y 1m		
Highly-Able	19	D.2	17y 9m	14y 10m	2y 11m	1.68	0.10
Control	13	D.2	13y 3m	11y 3m	2y 0m		

Highly-Able and Control Group samples have been drawn, must be rejected. Thus the null hypothesis is rejected for the Main Groups of 73 and 64 children and in the case of the two Sub-Groups of 31 Highly-Able and 41 Control children.

English Achievement Indices: On the basis of the same data as used for the calculation of the educational quotients, a second form of examination has been undertaken. Here the difference between the mental age and English age of each child has been taken and the variation between the means of the resultant distributions for the Highly-Able and Control Group pupils has been studied for statistical significance.

Table 6/5 shows the data for the pairs of distributions in respect of English test A.2, B.2, C.2 and D.2. For the Main Groups consideration of the values shown for the first three tests indicates the gaps between the means for the two sets of children are significant at the $p <$ .05, .02 and .01 levels of probability respectively. When the values for the two sub-groups are taken, as set out in Table 6/6, the levels of significance become markedly higher, p being less than .001 in respect of the results for both B.2 and C.2, and than .01 for both A.2 and D.2.

The achievement indices are set out in Table 6/7 for the English test series as an entity for the whole sample groups of 73 Highly-Able and 64 Control pupils, and for the two sub-groups of 31 and 41 children shown separately. The 't' values here are very large, indicating a high probability that the members of the pairs of sample groups are drawn from different populations.

TABLE 6/6

HIGH AND LOW IQ SUB-GROUPS
ACHIEVEMENT INDICES FOR ENGLISH LANGUAGE:
Mental Age less Educational Age

SUB-GROUP	NO.	NFER ENGLISH TEST	MEAN MENTAL AGE	MEAN ENG. EDUCATIONAL AGE	MEAN DIFFERENCE MA-EA	't' RATIO	SIGNIFICANCE p<
Highly-Able IQ 160 and over	15	A.2	11y 11m	9y 1m	2y 10m	3.51	0.01
Control IQ 120 and under	19	A.2	8y 2m	6y 10m	1y 4m		
Highly-Able 160 & over	9	B.2	15y 3m	11y 10m	3y 5m	4.00	0.001
Control 120 & under	8	B.2	10y 2m	9y 1m	1y 1m		
Highly-Able 160 & over	8	C.2	17y 4m	13y 2m	4y 2m	4.90	0.001
Control 120 & under	6	C.2	11y 3m	10y 3m	1y 0m		
Highly-Able 160 & over	7	D.2	18y 9m	14y 3m	4y 6m	3.99	0.01
Control 120 & under	9	D.2	12y 7m	10y 10m	1y 9m		

TABLE 6/7

ACHIEVEMENT INDICES FOR COMBINED ENGLISH SCORES ON A.2, B.2, C.2, D.2 and E.2:
Mental Age less Educational Age.

GROUP	NO.	MEAN CHRON. AGE	MEAN MENTAL AGE	MEAN ENG. EDUC. AGE	MEAN DIFFER. MA-EA	't' RATIO	SIGNIFICANCE p<
All Highly-Able	73	8y 8m	14y 0m	11y 5m	2y 7m	4.67	0.001
All Control	64	8y 9m	10y 3m	8y 9m	1y 6m		
IQs 160 and over	31	8y 5m	14y 11m	11y 7m	3y 4m	6.61	0.001
IQs 120 AND UNDER	41	8y 10m	9y 11m	8y 6m	1y 4m		

Accordingly, when the basic information is analysed in respect of the achievement indices, while the null hypothesis (b) (i), (ii), (iii) and (iv) for English language must be retained in one case - for test D.2 between the Main Groups - it is rejected with various degrees of confidence in the other nine instances. The level of significance of the results is highest when the values for the English test series are taken as an entity, the probability level that the children are drawn from the same populations being less than .001 in both cases.

Once more, taking the values as a whole for the Main Groups and the Sub-Groups, a greater discrepancy is shown between the mean mental and mean English age for the Sub-Groups as compared with the Main Groups. The general pattern which emerges from this sequence of achievement indices is that the degree of significance of the gaps between them increases as one moves from the Main to the Sub-Groups - it continues to increase when the full sample of 73 Highly-Able and 64 Control children are compared and is at its most significant in respect of the High IQ Sub-Group of 31 and the Low IQ Sub-Group of 41 pupils.

The above trend follows the pattern already shown by the foregoing comparison of the means of the distributions of quotients, (p. 136) but in the latter case, the results are of greater statistical significance.

Mathematics Attainment

Tables 6/8 to 6/13 inclusive, give similar information in respect of mathematics as has been rendered by the first set of tables for reading and English language.

Mathematics: Educational Quotients: The educational quotients calculated for the separate tests of the N.F.E.R. Basic Mathematics series are set out in Tables 6/8 and 6/9. As before, the first table deals with the entire Main Groups, whereas Table 6/9 is concerned solely with the sub-groups.

Referring to Table 6/8, in the case of Basic Maths 'A' there are significant differences at the .001 level between the values obtained for the two Main Groups and for the High and Low IQ Sub-Groups. For Basic Maths 'B' and Maths 'DE' the differences are not significant either for the Main Groups or for the sub-groups. However, for Basic Maths 'B', the Highly-Able mean is slightly lower than for the Control Group whereas for Maths 'DE' it is slightly higher. For the comparisons between the High and Low IQ Sub-Groups (Table 6/9) the quotient mean may be seen to be markedly lower for the High IQ Sub-Group in the case of Basic Maths 'B' than for the Low IQ Sub-Group but on the contrary is correspondingly higher for the Low IQ Sub-Group on test 'DE'.

The values for the educational quotients for Basic Maths 'C' also show that the Main Highly-Able Group has attained at a level relative to their ability, above that reached by the Main Control Group and in this instance the difference is sufficient to be significant at the $p<.05$ level but the relationship of the means for the Highly-Able and Control Groups is the reverse of that found with Basic Maths 'A'. As may be seen from Table 6/9, the same result is found when the High and Low IQ Sub-Groups are compared but the excess value of the Highly-Able Sub-Group has been reduced and it is not significant.

TABLE 6/8

MAIN GROUPS - MATHEMATICS

EDUCATIONAL QUOTIENTS: $\frac{EA}{MA}$ x 100

GROUP	NFER TEST	NO.	MEAN CHRON. AGE	MEAN MENTAL AGE	MEAN N.FER. MATH. AGE	MEAN $\frac{EA}{MA}$ x 100	't' RATIO	SIGNI-FICANCE $p<$
Highly-Able	Basic 'A'	32	6y 11m	10y 10m	8y 0m	75	-3.53	0.001
Control	Basic 'A'	30	7y 1m	8y 3m	6y 9m	82		
Highly-Able	Basic 'B'	12	8y 1m	13y 0m	11y 3m	87	-0.20	-
Control	Basic 'B'	10	8y 3m	10y 1m	8y 10m	88		
Highly-Able	Basic 'C'	21	9y 2m	15y 6m	13y 3m	87	+2.35	0.05
Control	Basic 'C'	17	9y 6m	11y 1m	8y 4m	75		
Highly-Able	DE	25	10y 6m	17y 6m	15y 6m	88	+0.74	-
Control	DE	14	11y 1m	13y 0m	11y 3m	85		

TABLE 6/9

MATHEMATICS

HIGH AND LOW IQ SUB-GROUPS

EDUCATIONAL QUOTIENTS: $\frac{EA}{MA} \times 100$

SUB-GROUP	NO.	NFER TEST	MEAN CHRON. AGE	MEAN MENTAL AGE	MEAN MATH. EDUC. AGE	MEAN RATIO MATH. EDUC. AGE: $\frac{EA}{MA} \times 100$	't' RATIO	SIGNIFICANCE $p <$
IQ 160 and over	14	Basic 'A'	7y 0m	11y 10m	8y 3m	70	-5.43	0.001
IQ 120 and under	19	Basic 'A'	7y 3m	8y 2m	6y 10m	83		
IQ 160 and over	7	Basic 'B'	7y 11m	13y 5m	11y 3m	84	-0.97	-
IQ 120 and under	6	Basic 'B'	8y 2m	9y 7m	8y 8m	90		
IQ 160 and over	12	Basic 'C'	8y 11m	16y 2m	13y 9m	88	+1.79	+0.10
IQ 120 and under	12	Basic 'C'	9y 7m	10y 7m	8y 3m	77		
IQ 160 and over	11	DE	10y 0m	18y 5m	16y 11m	86	+1.11	-
IQ 120 and under	10	DE	11y 1m	12y 5m	10y 2m	81		

Comparing Table 6/8 and 6/9 it is apparent that for tests 'A' and 'B' the relative level of performance of the High IQ Sub-Group, as compared with the Low IQ Sub-Group, is lower than that of the Main Highly-Able Group compared with the Main Control Group. For test 'C' too, although the direction of the difference is reversed here for both comparisons, the mean for the Highly-Able children's distribution of quotients being higher than for the Control Group, the gap is narrower in respect of the Sub-Groups than for the Main Groups. This pattern of the relationship of the Main Sample Groups and the Sub-Groups is in agreement with that which was found for reading and English language (p. 213). The only exception to this trend is in respect of Maths 'DE' where, while the differences are small, yet it may seen that the 't' ratio of +1.11 for the Sub-Groups is slightly higher than the corresponding value of +0.74 for the Main Groups in spite of the numbers of pupils involved being smaller.

The null hypothesis, (a) (i) p. 132, for mathematics for the Main Groups must be rejected for Basic Maths 'A' but retained in the cases of Basic Maths 'B' and Maths 'DE'. The null hypothesis must also be rejected for Basic Maths 'C' but it should be noted that a contrary relationship between the performances of the Highly-Able and Control Groups has been shown here.

As regards the High and Low IQ Sub-Groups, the null hypothesis is rejected here too for Basic Maths 'A' but it is retained for Basic Maths 'B' and 'C' and Maths 'DE'.

Table 6/10 for mathematics corresponds to Table 6/4 for English language. The means of the educational quotients are of distributions covering the mathematics test series as a whole in respect of the 72

TABLE 6/10

MATHEMATICS

EDUCATIONAL QUOTIENTS:

$\frac{EA}{MA} \times 100$ FOR COMBINED SCORES

BASIC MATHS 'A', 'B', 'C', MATHS 'DE' AND 'FG'.

GROUP	NO.	MEAN CHRON. AGE	MEAN MENTAL AGE	MEAN MATHS AGE	MEAN RATIO MATHS $\frac{EA}{MA} \times 100$	't' RATIO	SIGNI-FICANCE
Highly-Able	72	8y 9m	14y 2m	11y 8m	82	-0.24	-
Control	64	8y 8m	10y 3m	8y 5m	82		
Sub-Group IQs 160 and over	31	8y 6m	15y 2m	12y 0m	79	-1.14	-
Sub-Group IQs 120 and under	41	9y 2m	9y 11m	8y 1m	82		

Note: 72 children - not 73 - as one child moved away before field-work was complete.

Highly-Able children and the 64 Control pupils who completed one or more mathematics tests. As before, only one standard score per child, that for the most advanced test completed by the pupil has been utilised in the calculations from which the means of the distributions of quotients have been obtained; as a result scores gained on Maths Test FG have been incorporated in the calculated values.

As may be seen from Table 6/10, there is no significant difference between the means of the quotients of the Main Groups, nor between those of the Sub-Groups. However, there is a tendency for the negative relationship between the means of the quotients of the Highly-Able Group and the Control Group to be greater for the two Sub-Groups than for the Main Sample Groups. This finding is in line with those already noted in respect of reading and English language.

On the basis of the above considerations, the null hypothesis (a) (iii) and (iv), that there is no significant difference between the educational quotients for the overall performances of the Highly-Able and Control Main Groups and the High and Low IQ Sub-Groups, cannot be rejected.

Achievement Indices for Mathematics: Table 6/11 shows the results obtained in respect of the mathematics tests, Basic Maths 'A', 'B', 'C' and Maths 'DE' for the Main Groups. While a highly significant difference was obtained between the values for the two groups of infants who worked Basic Maths 'A', the results for the other three mathematics tests in the series showed only small, non-significant differences. For Basic Maths 'B' and Maths 'DE', the values of the indices are six months and three months respectively larger for the Highly-Able than for the corresponding Control Group. In the case of test 'C' the position of the two Main Groups is reversed. The gap between mental age and mathematics educational age is five months greater for the Control Group than it is for the Highly-Able pupils.

The results, then, for the three mathematics tests, 'B', 'C' and 'DE' are at the same time both contradictory and indecisive in their indications. For these tests no marked difference is shown between the level of attainment relative to ability of the two Main Groups.

TABLE 6/11

MAIN GROUPS - MATHEMATICS

ACHIEVEMENT INDICES:

Mental Age less Educational Age.

GROUP	NO.	NFER TEST	MEAN MENTAL AGE	MEAN MATH. EDUC. AGE	MEAN DIFF. MA-EA	't' RATIO	SIGNIFICANCE p<
Highly-Able	32	Basic 'A'	10y 10m	8y 0m	2y 10m	5.16	0.001
Control	30	Basic 'A'	8y 3m	6y 9m	1y 6m		
Highly-Able	12	Basic 'B'	13y 0m	11y 3m	1y 9m	0.95	-
Control	10	Basic 'B'	10y 1m	8y 10m	1y 3m		
Highly-Able	21	Basic 'C'	15y 6m	13y 3m	2y 3m	-0.71	-
Control	17	Basic 'C'	11y 0m	8y 4m	2y 8m		
Highly-Able	25	DE	17y 6m	15y 6m	2y 0m	0.46	-
Control	14	DE	13y 0m	11y 3m	1y 9m		

TABLE 6/12

MATHEMATICS - HIGH AND LOW IQ SUB-GROUPS: ACHIEVEMENT INDICES - Mental Age less Educational Age

SUB-GROUP	NO.	NFER MATHS. TEST	MEAN MENTAL AGE	MEAN MATH. EDUC. AGE	MEAN DIFFER. MA-EA	't' RATIO	SIGNIFICANCE p <
IQ 160 and over	14	Basic 'A'	11y 10m	8y 3m	3y 7m	6.75	0.001
IQ 120 and under	19	Basic 'A'	8y 2m	6y 10m	1y 4m		
IQ 160 and over	7	Basic 'B'	13y 5m	11y 4m	2y 1m	1.72	-
IQ 120 and under	6	Basic 'B'	9y 7m	8y 8m	11m		
IQ 160 and over	12	Basic 'C'	16y 2m	13y 10m	2y 4m	-	-
IQ 120 and under	12	Basic 'C'	10y 7m	8y 3m	2y 4m		
IQ 160 and over	11	'DE'	18y 5m	16y 11m	2y 6m	0.42	-
IQ 120 and under	10	'DE'	12y 5m	10y 2m	2y 3m		

Turning to Table 6/12, the values are given for the two Sub-Groups in respect of each of the mathematics tests separately. As found previously, the values indicate relatively larger gaps between mental age and educational age for the High IQ Sub-Group than for the Main Group of Highly-Able children. As regards the Low IQ Sub-Group, the reverse is the case for Basic Maths 'A', 'B' and 'C' since the corresponding gaps are reduced. Only in the case of Maths 'DE' does the gap between mental and educational age increase as in the case of the High IQ Sub-Group.

For test 'A', the achievement index indicates a very significantly greater gap than for the Control Group, the 't' value being significant at the p < .001 level. In the remaining tests, however, although the differences for the Highly-Able Group increase, as from the Main to the Sub-Groups in each case, showing larger gaps, there are no significant differences, partly because of the small numbers of individuals in the Sub-Groups.

TABLE 6/13 **MATHEMATICS - ACHIEVEMENT INDICES FOR COMBINED SCORES BASIC 'A', 'B', 'C', 'DE' AND 'FG', Mental Age less Educational Age.**

GROUP	NO.	MEAN CHRON. AGE	MEAN MENTAL AGE	MEAN MATHS EDUC.AGE	MEAN DIFF. MA-EA	't' RATIO	SIGNIFICANCE p<
All Highly-Able	72	8y 9m	14y 2m	11y 8m	2y 6m	) 3.14	0.005
All Control	64	8y 8m	10y 3m	8y 5m	1y 9m	)	
IQs 160 & over	31	8y 6m	15y 2m	12y 0m	3y 2m	) 4.37	0.001
IQs 120 & under	41	9y 2m	9y 11m	8y 1m	1y 9m	)	

Note: 72 Highly-Able children as one pupil moved to a new area before completing the Mathematics Attainment Test.

The combined results of the mathematics test series are given in Table 6/13. As explained previously, (p. 216) in producing the values for the test series as a whole only one score per child has been included in the calculations so that double-counting is avoided.

For the Main Groups the achievement index of the Highly-Able pupils is greater than that of the Controls by only nine months, yet because of the far larger number of degrees of freedom involved, the 't' ratio shows a high degree of significance with $p < .005$. As in each of the previous cases, the divergence between the Sub-Groups is larger than for the Main Groups and the difference is a gap of 1y 5m, which is even more significant, $p < .001$.

When the achievement indices, as in the case of the quotients, are taken as the measures of the children's ability and attainment, the null hypothesis (b) (i) and (ii) that the two samples of children derive from the same population as regards their relative achievements in mathematics must be retained in six instances; namely, in respect of tests 'B'. 'C' and 'DE' for both the Main Groups and the Sub-Groups; it is, however, rejected in the two instances involving test 'A'.

The null hypothesis (b) (iii) is rejected at the .005 level of confidence for the Main Groups when the whole samples of 72 Highly-Able and 64 Control children are taken as an entity for the mathematics test series. For the High and Low IQ Sub-Groups, the null hypothesis is rejected at the .001 confidence level in respect of a similar comparison.

THREE HIGHLY-ABLE SUB-GROUPS COMPARED ACCORDING TO THE METHOD OF THE CHILDREN'S NOMINATION

As described in Chapter 5, of the 73 Highly-Able children included in the sample, 24 were nominated by their parents and psychologists, etc., 37 by their teachers. The remaining twelve pupils were originally nominated by their teachers as children of average ability who might be pairing Controls for the Highly-Able children who were members of the same school classes. As already described (p. 187) twelve of the candidate Control pupils scored an IQ of 141 or over on the Stanford Binet test and consequently they have been included in the Highly-Able Group where they form the Sub-Group known as 'Ex-Controls".

Since the Ex-Controls Sub-Group consisted of pupils who had not been identified by their teachers as of outstanding ability, it seemed likely that their level of attainment in reading, English and mathematics might be at a relatively lower level than for the remainder of the Highly-Able Group. It appeared, too, that it was of interest to enquire whether or not there was a difference in the level of performance quotients and indices according to whether the remaining children had been nominated by their parents or their teachers.

On the basis of the source of their candidature for membership of the Highly-Able Sample, three Sub-Groups have been formed as follows:-

(a) 37 pupils nominated by his/her teacher,

(b) 24 pupils nominated by his/her parents, Child Guidance Clinic, etc.

(c) 12 candidate Control pupils identified as Highly-Able when tested - subsequently referred to as the Ex-Control Sub-Group.

The performances of the three Highly-Able Sub-Groups in reading, English language and mathematics have been compared in respect of the achievement quotients and indices obtained. Tables B/1 to B/4 inclusive in Appendix B show the calculated values.

The results indicate that there is no significant difference between the three Sub-Groups, but the answers obtained are unreliable as the numbers of pupils in the Sub-Groups are very low. Accordingly, the absence of statistical significance is not unexpected but it is rather more surprising to discover that there is no obviously discernible pattern in the direction of the differences.

The null hypothesis (a) (v) and (b) (v) cannot be rejected for any of the comparisons made, the differences between the paired means of the educational quotients and indices for the three Highly-Able Sub-Groups being insignificant.

SUMMARY

Table 6/14 shows the 't' test results for the reading and English language test series, with the tests taken singly and as a series - for each the degree of measured attainment relative to measured ability has been calculated in two ways, i.e., as a quotient and as an index (the mean difference between mental and educational age).

TABLE 6/14 **SUMMARY TABLE:**

Reading and English Language

QUOTIENTS ($\frac{EA}{MA}$ x 100) PER TEST:	MAIN GROUPS			SUB-GROUPS		
	't' Ratio	Significance $p <$	Direction of Difference	't' Ratio	Significance $p <$	Direction of Difference
Reading	0.98	-	Positive	0.40	-	Positive
English A.2	1.00	-	Negative	1.77	0.1	Negative
English B.2	1.46	0.2	Negative	3.48	0.01	Negative
English C.2	2.29	0.1	Negative	3.37	0.01	Negative
English D.2	0.40	-	Negative	2.71	0.05	Negative
English Series A.2, B.2,C.2,D.2 & E.2	2.20	0.05	Negative	3.82	0.001	Negative
INDICES (EA less MA)						
Reading	0.20	-	Positive	0.76	-	Negative
English A.2	2.26	0.05	Negative	3.51	0.01	Negative
English B.2	2.69	0.02	Negative	4.74	0.001	Negative
English C.2	3.33	0.01	Negative	4.90	0.001	Negative
English D.2	1.68	0.1	Negative	3.99	0.01	Negative
English Series A.2, B.2,C.2,D.2 & E.2	4.67	0.001	Negative	6.61	0.001	Negative

Note: Abbreviations: MA - Mental Age, EA - Educational Age
p - probability

TABLE 6/15

SUMMARY TABLE: MATHEMATICS

QUOTIENTS ($\frac{EA}{MA} \times 100$) AFTER TEST:	MAIN GROUPS			SUB-GROUPS		
	't' Ratio	Significance $p <$	Direction of Difference	't' Ratio	Significance $p <$	Direction of Difference
Basic 'A'	-3.53	0.001	Negative	-5.43	0.001	Negative
Basic 'B'	-0.20	-	Negative	-0.97	-	Negative
Basic 'C'	+2.35	0.05	Positive	+1.79	0.1	Positive
'DE'	+0.74	-	Positive	+1.11	-	Positive
Series Basic 'A', 'B', 'C', 'DE' & 'FG' combined	-0.24	-	Negative	-1.14	0.2	Negative
INDICES (EA less MA)						
Basic 'A'	-5.16	0.001	Negative	-6.75	0.001	Negative
Basic 'B'	-0.95	-	Negative	-1.72	-	Negative
Basic 'C'	+0.71	-	Positive	+0.01	-	Positive
'DE'	-0.46	-	Negative	-0.42	-	Negative
Series Basic 'A', 'B', 'C', 'DE' & 'FG' combined	-3.14	0.005	Negative	-4.37	0.001	Negative

TABLE 6/16 RETENTION OR REJECTION OF NULL HYPOTHESES FOR READING, ENGLISH LANGUAGE AND MATHEMATICS

SUBJECT AREA	METHOD OF CALCULATION	NULL HYPOTHESES REJECTED $p < .05$			
		MAIN GROUPS		HIGH & LOW IQ SUB-GROUPS	
		YES	NO	YES	NO
READING	QUOTIENT		1		1
READING	INDEX		1		1
ENGLISH A.2	QUOTIENT		1		1
" B.2	"		1	1	
" C.2	"		1	1	
" D.2	"		1	1	
" Series Combined	"		1	1	
ENGLISH A.2	INDEX	1		1	
" B.2	"	1		1	
" C.2	"	1		1	
" D.2	"		1	1	
" Series Combined	"	1		1	
MATHEMATICS BASIC 'A'	QUOTIENT	1		1	
" " 'B'	"		1		1
" " 'C'	"		1		1
" " 'DE'	"		1		1
MATHS SERIES COMBINED	"		1		
MATHEMATICS BASIC 'A'	INDEX	1		1	
" " 'B'	"		1		1
" " 'C'	"		1		1
" " 'DE'	"		1		1
MATHS SERIES COMBINED	"			1	
TOTALS		6	15	12	9

For the twelve comparisons between the Main Groups, four show gaps too small to have much weight, while five calculations show 't' ratios at the .05 (or greater) level of confidence. For the High IQ and Low IQ Sub-Groups, in only three cases are the separations between the means obtained too small to have significance; in the other nine cases the 't' value gives $p < .05$ to $p < .001$. In all cases, except reading, the results indicate that the Control Group obtained a relatively higher degree of achievement then the Highly-Able Group.

Although generally pointing in the same direction, the 't' values give in T ble 6/15 in repsect of the mathematics tests are less clear-cut.

For the two Main Groups, six out of the ten 't' tests calculations are indicated as not significant, while one of the remaining four calculations is shown to be significant in the opposite direction. When the Sub-Group results are compared, the number of non-significant results decreases to five, while the contrary result for test 'C' has fallen so as to give a barely significant value of $p < .1$.

The educational quotients and indices indicate a relatively lower level of attainment by the Highly-Able Group, though not necessarily to a significant extent, than by the Controls in seven out of the ten comparisons in respect of both the Main and Sub-Groups.

No significant differences were found between the quotients or indices obtained between the three Highly-Able Sub-Groups formed according to the source of the child's nomination.

Chapter 7

RESULTS 2 - THE QUESTIONNAIRES

Three sets of completed questionnaires concerning the sample's school life provide information and express some of the attitudes and beliefs of the children's teachers, their parents, and the pupils themselves, about the children's school environment, their social relationships and occupational choices both at school and at home. Although the material consists largely of the subjective opinions of those who have completed the forms, the information collected may nevertheless be taken as a basis for comparing the situation of the Highly-Able and Control Group children within the context of the school framework.

The three sets of completed questionnaires, and the four sections contained within each, have been considered sequentially. The questionnaires pertaining to the Highly-Able children have been compared with those relating to the Average-Bright Control pupils; the patterns of the options selected in answering the multiple-choice questions have been studied and the significance of differences between the Highly-Able and Control Groups has been examined by use of the chi-square test.

CHILDREN'S QUESTIONNAIRES

Of the 73 Highly-Able children, 69 (93.5%) completed a questionnaire, while of the Control Group, 63 of the 64 (98.4%) pupils did so.

It was necessary to design two versions of the questionnaire, one each for the infants and the junior children on account of differences in their school curriculum. Where, as in most cases, the same question appears on both editions, although the wording of the questions may differ slightly, the children's answers have been combined for purposes of statistical analysis. Three questions were asked of the juniors only, and this fact is stated when giving the relevant results.

The questions come under four headings:-

1) Attitude to school, and general aspects of the school day and its organisation,
2) Preferences for different parts of the school's formal curriculum,
3) Relationships with peer group,
4) Choice of home occupations.

1) Attitude to School, and the Organisation of the School Day

The children's answers to the first group of questions relating to their general feelings about school are given in Table 7/1.

In their replies to Question 1, there is a surprising degree of agreement. 55% each of the Highly-Able and of the Control children indicate that they like school, 'Very Much', while just under one-third of the former Group, and over one-third of the latter, choose the option 'Quite a lot'.

Question 4 is addressed to the junior children only. It asks whether they would prefer to be 'At home', 'At school' or 'Somewhere else', and it is intended in part to be a check upon the consistency of their replies regarding the extent to which they like school. The

TABLE No. 7/1 CHILDREN'S QUESTIONNAIRES

General Attitudes Relating to School

(Percentages of 73 Highly-Able and 64 Control Pupils)

Q.1 Do you like school?	Very Much	Quite a Lot	Not Much	Not at all Hate it	No information
Replies: Highly-Able Group	55	32	8	-	5
Control "	55	36	3	4.5	1.5

Q.2 Do you like best?	Being in the class-room	Hall for music, films, etc.	Play-time	After School Clubs	No information
Replies: Highly-Able Group	25	24	38	6	7
Control "	19.5	26	45	5	5

Q.3 Do you like lessons best as?	Class Teaching	Table Gp. of 4 or 5	Work with one other	Working on your own	No information
Replies: Highly-Able Group	16	18.5	16	42.5	7
Control "	24	17	20	34	5

Q.3(a) JUNIORS ONLY* Do you like working so?	All the time	Some of time	A little of time	No information
Replies: Highly-Able Group	14	74	5	7
Control "	14	66	11	9

Q.4 JUNIORS ONLY* In term-time do you prefer to be?	At home	At school	Somewhere else	No information
Replies: Highly-Able Group	9.5	56	23	12
Control "	29	49	20	3

* Total numbers of juniors in the sample are:-
Highly-Able - 42: Controls - 35.

choice of being 'At home' is placed first and it is separated intentionally by a question on a different topic from the first enquiry regarding the degree to which school is enjoyed. The replies of the Highly-Able Group to Question 4 are in close agreement with their answers to Question 1, 56% (as against 55%) choosing to be in school while 49% (as against 55%) of the Control children make the same choice. 9.5% of the Highly-Able and 29% of the Control Group choose home as their first option. It seems possible that the larger proportion opting for 'home' of the Control children may not represent a conscious choice on their part but that it is a result of the fact that this alternative was listed first, while the Highly-Able children may have selected their option with greater deliberation.

As regards Question 2, the replies from the two Groups again follow the same pattern. However, it is perhaps surprising to find that a quarter of the Highly-Able Group, and almost a fifth of the Average-Bright Group select being in the class-room as the part of the school day they prefer. As might be anticipated, the highest proportion of both Groups, 38% of the Highly-Able, and 45% of the Control children, select play-time as the part of the day they enjoy most.

The third question on Table 7/1 is concerned with how the children prefer to be taught. There is a difference of emphasis but it is not sufficient to be statistically significant. Almost a quarter of the Control children choose the situation where a teacher is addressing the whole class, while a third of them prefer to work on their own. Of the Highly-Able children, only 16% select class teaching, but over 40% state a preference for working on their own.

That such large proportions of both Groups of children should elect to give preference to working singly may be considered surprising. Since with infants the questions were posed verbally, the opportunity was taken to enquire from some of them why such a choice was made.

Although not the direct subject matter of this thesis, the unexpected nature and extent of the children's comments upon their manner of working seems to justify their quotation in full. It is perhaps remarkable that the number of comments and their general content are so similar between the two Groups. Two Highly-Able and two Control Juniors volunteered the reasons for preferring to work singly without being asked to do so by the questionnaire. The children's comments are given below verbatim:-

Remarks made by the Highly-Able Group:-

Child No. 5	(Chron.Age 6yrs. 0m.)	"When I'm with somebody else it puts me off my work".
" No. 7	(" " 6yrs. 0m.)	"It is much more quieter".
" No.14	(" " 6yrs.10m.)	"It's quieter".
" No.15	(" " 7yrs. 0m.)	"Because noise interrupts me".
" No.18	(" " 8yrs. 0m.)	"Because nearly everyone else chats to me. I am working myself and I like it best".
" No.22	(" " 7yrs.11m.)	"Prefer by myself - you can choose and do project work".
" No.28	(" " 7yrs. 6m.)	"Don't really know why".
" No.30	(" " 7yrs.11m.)	"You have some peace and quiet".
" No.39	(" " 9yrs. 7m.)	"Otherwise people chat too much".

Remarks made by Control Group:-

Child No. 4a	(Chron.Age 8yrs. 0m.)	"I can understand better".
" No.11a	(" " 6yrs. 9m.)	"As too much noise".
" No.26a	(" " 7yrs. 2m.)	"Can get some peace and quiet".
" No.27a	(" " 7yrs. 2m.)	"I can get on with my work quickly".
" No.28a	(" " 7yrs. 3m.)	"It's not so noisy".
" No.30a	(" " 7yrs. 9m.)	"No-one can bother me then".
" No.31a	(" " 7yrs. 9m.)	"Get on better".
" No.46a	(" " 9yrs. 9m.)	"Quieter and you can work more easily".
" No.66a	(" " 11yrs.7m.)	"It's much quieter. I can't get on with other children when they talk".

That so many (42% of the Highly-Able and 34% of the Control) expressed a preference for working on their own is even more surprising when it is remembered it was the fourth and last choice on the list of options given for that particular question. The Juniors had a supplementary question which asked if they preferred to work singly for part or most of the time and here the great majority (74% of the Highly-Able, and 66% of the Control Group) selected the alternative 'some of the time', which seems to indicate that the children fully understood the implications of the question as regards their preferred manner of working.

2) Children's Preferred Curriculum Areas

Section 2 of the questionnaire deals with the children's preferences for different parts of the school's formal curriculum. The seventeen alternatives offered on the form have been grouped into nine options for the purposes of analysis. This has been done by placing items rarely selected by the children into an appropriate subject area, i.e., Science, receiving only two choices (possibly because primary school curriculums often do not take the subject matter involved under this heading) has been categorised with Mathematics. Nature Study, Social Studies, Free Activity, School TV and Project, have all been grouped together partly because of a certain link between them, and partly because each individually was selected only occasionally. Pottery and Craft-Work too, have been combined.

In order that their responses should not be inhibited the children were not restricted on the questionnaire as to the number of preferred curriculum areas they might name but this has led to considerable variation from child to child in the quantity of choices made. Consequently, so that the likings of a few individuals should not be disproportionately reflected in the values calculated, the choices taken from each form have been limited to three. In the case of the infants, where the questionnaire was given verbally, the children were asked, after they had listed all the things they liked, to indicate their first, second and third choices from among the options they had already selected. Where the number of choices by juniors exceeded three and where any, or all, of the options Reading, Creative Writing and Mathematics had been chosen, these curriculum areas have been included in the values rather than any other alternative, additional choices made since this study has been concerned elsewhere (chapter 6) with the levels of attainment reached in these. This procedure was adopted in respect of both Groups so that it has not affected the examination of the differences between them but it may have resulted in an under-representation of the children's liking, particularly in the case of the Control Group, for the craft subjects.

Approximately 80% of the three choices given were utilised by both groups of children. Values for the three subject areas chosen are given in Table 7/2; the children's first choices, where they have indicated these, are shown separately on Table 7/3.

As may be seen from Table 7/2, Reading received 52 choices out of a possible 73 by the Highly-Able children, but only 30 out of a possible 64 by the Control Group - a difference shown as significant - by the chi-square test at the $p < .01$ level. The difference between the 5 and 13 choices of Pottery and Craft, made by the Highly-Able and Control Groups respectively, is

TABLE 7/2 CHILDREN'S QUESTIONNAIRES:

Combined Values for Choices of Three Most Preferred Subject Areas

SUBJECT AREA	Number of Choices		% of Choices	
	Highly-Able Group	Control Group	Highly-Able Group	Control Group
Reading	52	30	23.7	15.7
Creative Writing	18	12	8.2	6.3
Painting & Drawing	16.5	20	7.5	10.5
Music & Singing	12	11	5.5	5.8
Music & Movement	3.5	6	1.6	3.1
Maths & Science	38	28	17.4	14.7
Pottery & Craft	5	13	2.3	6.8
Nature Study, Project, Soc. Studies, School TV, Free Activity	20.5	24	9.4	12.6
Swimming & Outdoor Games	9.5	11	4.3	5.8
Total Choices Made	175	156	79.9	81.2
No Information	44	36	20.1	18.8
TOTAL POSSIBLE CHOICES	219	192	100.0	100.0

significant at the $p < .05$ level. There is also variation between the relative popularity of the two subject areas, Reading gaining the largest number of choices by the Highly-Able Group, while Pottery and Craft are chosen more frequently by the Control Group. For the remaining seven subject areas since either the variation between the sample groups was limited or because the numbers involved were small the differences in the number of choices made by the two Groups are not statistically significant. However, in Creative Writing and the Mathematics-Science area, there is a greater proportion of choices made by the Highly-Able Group, while for Painting and Drawing, the several activities grouped with Project, and for Swimming and Outdoor Games, the choices given by the Highly-Able children are proportionally less than those given by the Control Group. In the case of Music and Singing the proportions (12 out of 73 and 11 out of 64) are almost identical.

TABLE 7/3 CHILDREN'S QUESTIONNAIRE - SCHOOL CURRICULUM. FIRST CHOICES ONLY FOR PREFERRED SUBJECT AREAS.

SUBJECT AREA	Reading	Creative Writing	Painting & Drawing	Music & Singing	Music & Movement	Maths & Science	Pottery & Craft	Nature Study Proj. Social Studies School TV Free Activ.	Swimming & Outdoor Games	No Inf.	Max Pos
No. Highly-Able	24.5	5	1	4	1	13	1.5	5	2	16	73
No. Control Group	9	3.5	8	3.5	2	12	4	8	2	12	64
% Highly-Able	33.6	6.8	1.4	5.5	1.4	17.8	2.1	6.8	2.7	21.9	99.8
% Control	14.1	5.5	12.5	5.5	3.1	18.8	6.3	12.5	3.1	18.8	100.2

Note: Where two subjects were given the Results are expressed as "0.5 of a child".

The percentage of the children in the two categories who have not made their choices clear, 20.1% and 18.8%, while slightly larger for the Highly-Able Group, are very similar and this difference between the groups is not significant.

A similar picture is presented by Table 7/3 which shows the children's curriculum preferences when indicating a most favoured single choice. Here a third of the Highly-Able children selected Reading as their first choice of school work as compared with just under one-seventh of the Control Group. Differences between these values are of even more significance (p .001) than when the children were allowed three options.

When given only one choice, the number of children selecting Creative Writing remained about the same as when three choices were allowed, the number of the Highly-Able Group exceeding by a small amount those of the Control Group. For Pottery and Craft, the proportion 1.5 : 4 in respect of the number of the Highly-Able to Control children is very close to that found previously when it was 5 : 13, and the values are here statistically significant ($p<.05$).

There are further values of statistical significance in Table 7/3 in respect of the number of choices for Painting and Drawing, one and eight being made by the Highly-Able and Control children respectively. As it may be seen also in Table 7/2, this school activity is chosen less often by the Highly-Able than by the Control Group.

For Project and the activities which have been classified with it, more Control children than Highly-Able children chose these subject areas whether the children were allowed three choices or only one. The percentage of the Highly-Able children selecting these activities decreased from 9.4% to 6.8% when offered only one choice, while the percentage in the case of the Control Group remained steady at 12.6% and 12.5%. However, on account of the heterogeneous nature of this classification which was made as a matter of convenience since each of the individual items received few choices, it seems reasonable that little weight should be given to the discrepancy.

Slightly fewer of the Highly-Able children selected Swimming and Outdoor Games when presented with three choices, while only two children from each of the categories chose this curriculum activity when given one choice only. The proportions of the two Groups selecting this alternative were similar whether in respect of three or one choice, although in both cases the percentage was smaller for the Highly-Able children. An almost identical percentage of children selected Music and Singing, whether offered three choices or only one.

There is an interesting alteration in the number of choices of Mathematics and Science according to whether three choices or one were allowed. When the children were given three options, the Highly-Able chose this subject area more frequently (17.4%), than the Control Group, (14.7%), but when only one choice was available, only 17.8% of the Highly-Able selected it as compared with 18.8% of the Control Group.

There is little difference in the percentage of children for whom no information is available: 20.1% and 21.9% of the Highly-Able failed to indicate their three preferred curriculum areas or their most favoured single choice, respectively. Corresponding values for the Control Group are 18.8% in both contexts.

Thus, summarising the selections shown in Tables 7/2 and 7/3, it may be seen that the pattern depicted is very similar with the exception of Mathematics and Science. On the one hand, Reading, and to a lesser extent Creative Writing, are the options favoured by the Highly-Able Group; on the other, Pottery and Craft, Painting and Drawing, Project, Nature Study and the other activities classified with them, Music and Movement and, to a marginal extent, Swimming and Outdoor Games, are all selected relatively more frequently by the Control children. There is no difference between the two Groups in regard to their choices of Music and Singing.

JUNIOR PROJECTS

Two thirds of the 42 Highly-Able Juniors and three-quarters of the 35 average-Bright Control Juniors were working on a Project (Table 7/4(a). Of these, (see Table 7/4(b), a little under one-third of the Highly-Able, and a little under one-quarter of the Control Group indicated that they liked working on the Project 'Very Much'.

TABLE 7/4(a) CHILDREN'S QUESTIONNAIRES: Juniors Working on Projects

(Total pupils: Highly-Able 42; Control 35)
(Values in table are percentages).

QUESTION:	Are you working on a Project?		
	Yes	No	No Information
Highly-Able Group	67	21	12
Control "	74	17	9

TABLE 7/4 (b) PROJECTS - Views of 28 Highly-Able and 26 Control Pupils

(Values in table are percentages).

QUESTION:	WORK ON PROJECT - DO YOU?					
	Like it v.much	Quite a lot	Not much	Not at all	Hate it	No Inform.
Highly-Able Group	29	36	7	-	-	29
Control "	23	43	14	-	-	20

Another 36% of the first Group, and 43% of the Control Group chose the option 'Quite a Lot'. Only three of the Highly-Able and five of the Control children marked the choice 'Not Much', and none in either Group expressed dislike. Just under a third of the Highly-Able, and a fifth of the Control children, expressed no view.

3) Social Relationships

The third section of the Children's Questionnaire is concerned with the social relationships enjoyed by the two Groups. Question 7 asks whether the pupils prefer to be with their peers, their parents, or other adults. Over half the sample in both Groups (52% Highly-Able, 57% Control) elect to be with other children; 8% of the Highly-Able choose to be with their parents, while 15% of the Control pupils do so. 'Other grown-up people' is favoured by almost one quarter of both Groups.

The differences between the replies are not statistically significant, although the percentage of the Highly-Able Group stating a preference for being with other children is 5% lower than for the Control Group. There is a significant difference between the number of the Highly-Able children who do not respond to this question, 16%, as against 5% of the Control Group. It may be that the reticience of the Highly-Able Group on this point might bear further investigation. One child wrote in: 'On my own'.

TABLE 7/5 CHILDREN'S QUESTIONNAIRE: - FRIENDS

QUESTION:	No. of Highly-Able Replies	No. of Control Group Replies	% of Highly-Able Group	% of Control Group
Have you a Special Friend in your School Class?	42	36.5	57.5	57
Have you a Special Friend Not in your School Class?	5.5	5.5	7.5	9
Are you one of a Group of Friends?	14	17	19	27
Have you no Special Friends among children?	6.5	1	9	1.6
No Information given	5	4	7	6
TOTALS	73	64	100	100.6

The next question relates to the friends the children claim. The percentages (Table 7/5) replying that they have a special friend in their school class are almost identical for the two Groups (57.5% and 57%). The number of the children indicating that they are one of several friends is smaller for the Highly-Able Group, being 19% as against 27% in the Control Group. Since the numbers involved are small, there is no statistically significant difference ($p < .2$) between the 9% of the Highly-Able who think they have 'No Special Friend Among Children' and the one child among the Control children. Nevertheless, this latter variation between the two Groups might bear further investigation. There is a possibility that some of those reticient as regards whom they prefer to be with may be among those indicating that they have no special friends among children, and possibly also, no particular links with adults.

As regards the sex of the children's friends, 62% and 61% respectively state that their special friend is of the same sex. Although the numbers are small there is a difference in the proportion of children of a different sex with whom the Highly-Able are friends, 8% as against the 3% among the Control children. This may possibly be explained by common interests being found between the Highly-Able children which over-ride the normal pattern of interests based on whether children are boys or girls.

The infants' version of the Children's Questionnaire enquired whether the child's friend was at school or elsewhere. When questioned four of the Highly-Able children replied that their friend was not at school; such a situation was not indicated by any of the Control Group. The percentages, 40% and 42%, giving no information on this point are very similar for the two sets of children.

From the foregoing it appears that 5% - 10% of the Highly-Able children as compared with 1% - 3% of the Control Group had formed social relationships at variance with the commonly accepted pattern.

TABLE 7/6 CHILDREN'S QUESTIONNAIRE - Choice of Three Preferred Home Hobbies

GROUP	No.	Watching TV	Reading	Writing Stories	Drawing & Painting	Maths. & Puzzles	Music	Swimming & Outdoor Games	Looking After Pets	Making Something	No Inf. & Just Playing	Max. Poss.
Highly-Able Group	73	46	29	5	5	13	13	35	13	14	44	219
Control "	64	45	14	3	12	3	12	40	15	8	40	192
Highly-Able Group		21.2%	13.4%	2.3%	2.3%	6.0%	6.0%	16.1%	6.0%	6.5%	20.3%	100%
Control "		23.4%	7.3%	1.6%	6.3%	1.6%	6.3%	20.8%	7.8%	4.2%	20.8%	100%

Comparisons: Almost identical between two Groups:

TV 21.2% & 23.4%
Music 6.0% & 6.3%
No. Inform. 20.3% & 20.8%

Proportionately more Highly-Able Children

(i) Reading 13.4% & 7.3%
(ii) Making Something 6.5% & 4.2%
(iii) Maths. & Puzzles 6.0% & 1.6%
(iv) Writing Stories 2.3% & 1.6%

Proportionately Fewer Highly-Able Children

(i) Swim. & Outdoor Games 16.1% & 20.8%
(ii) Drawing & Painting 2.3% & 6.3%
(iii) Looking After Pets 6.0% & 7.8%

4) Home Interests

The children's selection of their three preferred home occupations are shown in Table 7/6. It may be seen that the proportions of the categories indicating a preference for 'Watching TV', and 'Music' are almost identical for the two Groups. There is, too, a very close similarity in the percentages of the two Groups giving no precise information.

In the cases of 'Reading', 'Writing Stories', 'Maths and Puzzles' and 'Making Something', proportionately more children in the Highly-Able Group have indicated that they spend their time at home on these occupations than has been done by the Control children. The gaps between the two categories for these four activities is clear-cut, but it is statistically significant only for Reading, ($p<.02$) and Maths and Puzzles ($p<.05$). It is noteworthy that the 'Writing Stories' option is selected only very few times by either of the two Groups.

'Swimming and Outdoor Games' and 'Looking after Pets' are both rather more popular occupations with the Control children, but the differences between the two Groups are small in both these areas.

There is a marked difference between the two Groups in the case of 'Drawing and Painting', and this variation is statistically significant ($p<.05$). This hobby is selected more than twice as frequently by the Control children as by the Highly-Able pupils.

Digest of Children's Views

The general picture of the Highly-Able and Control Group children which emerges is as follows:-

Highly-Able Group: The majority like school very much, and while playtime is the most favoured part of the day, the children also enjoy being in the class-room or in the hall for music, films, etc. The larger proportion prefer working on their own, the most common reason being given that it is quieter. Class teaching or working in a group with other children or one other child are all considered less favourably.

The curriculum areas preferred are 'Reading' which rates well above all the other alternatives, and it is followed most closely by 'Maths and Science'. The least favoured activities are 'Music and Movement', 'Pottery and Craft' and 'Painting and Drawing' with the choices for 'Swimming and Outdoor Games' and 'Music and Singing' being rather low. The majority of the Junior children are working on a Project and their most usual comment is that they like it 'Quite a Lot'.

Most of the children have a special friend of the same sex and in their school class, but almost 10% of them say that they have no friends among children.

As regards their chosen home occupations, watching TV is the most favoured option. It is followed by 'Swimming and Outdoor Games' and the third position is taken by 'Reading'. The least popular choices are 'Writing Stories' and 'Drawing and Painting'.

The Average-Bright Control Group: The response of the Control children follow very similar patterns to those of the Highly-Able, although there is variation in emphasis. Again, the majority state that they like school 'Very Much' and playtime is the most favoured part of the day although being in the class-room and in the hall for music, etc. is also enjoyed.

The majority of the children again prefer working on their own, but the proportion doing so is smaller than in the former Group. The proportion that favours class-teaching is larger, but that favouring working at a table with one or more other children is about the same.

'Reading' and 'Maths and Science' are given as the most favoured areas of the curriculum, but the proportions favouring them are smaller than in the former Group, and rather more prefer the subjects grouped with Project, 'Nature Study' etc. As with the former Group, 'Music and Movement' and 'Swimming and Outdoor Games' are the least favoured occupations, but the choices are not as small as for the Highly-Able children. Almost three-quarters of the Control Juniors indicate that they are working on a 'Project' and as with the former Group, the largest percentage show that they like it 'Quite a Lot'.

Almost exactly the same percentage as of the Highly-Able children indicate that they have a special friend of the same sex in their school-class; but in contrast to the Highly-Able Group, fewer indicate that they have no special friends among children.

As regards their preferred home activities, the largest and almost identical proportion elect 'Watching TV' as a chosen occupation. The second most favoured activity is 'Swimming and Outdoor Games' as in the case of the first Group, but in this latter case the proportion is somewhat higher. One of the two least favoured options is 'Writing Stories' and this is in line with a similar unpopularity among the Highly-Able Group. Equally unpopular is 'Maths and Puzzles' and this represents one of the sharper contrasts with the Highly-Able Group who classified this in an intermediate position in respect of its popularity with them.

5) SUMMARY

The pattern of the children's answers on the questionnaire as a whole indicates considerable consistency between the replies to one part of the questionnaire and those to another. This is seen particularly in the children's answers in respect of their choice of subject area in school and their chosen activities at home. In no instance is there a reversal in the proportional preferences indicated by the two Groups where the activities under home and school conditions are closely related.

The popularity or unpopularity of particular subject areas and home hobbies are again in accord as instanced by Reading in both contexts, and by the pairs, 'Creative Writing' and 'Writing Stories', 'Maths and Science' and 'Maths and Puzzles'. The Highly-Able children have expressed a majority selection of these choices under both home and school conditions.

For 'Drawing and Painting' the number of options given as a home activity is considerably lower than for school for both Groups, but once more the proportion of the Highly-Able children selecting this alternative is smaller, and the pattern of the proportional choices remains the same.

As might be expected, for both Groups the proportions choosing 'Swimming and Outdoor Games' are considerably greater when it is a home activity rather than part of the school curriculum. Even so, the proportion of the Control Group preferring this activity remains slightly larger than for the Highly-Able Group, as it was in the school setting.

11 PARENTS' QUESTIONNAIRES

Parent questionnaire forms were completed for 98% of the Highly-Able Group and 92% of the Control Group.

The original parent questionnaire was re-designed. Several of the questions on the earlier form requested information from the parents which the majority of them did not have with accuracy, such as the relative size of their son or daughter in relation to the peer group. Furthermore, it was decided to include a question asking the parents whether or not they supplemented their child's school teaching at home. The second version of the questionnaire remained in other respects essentially the same.

The parents who had already completed the first edition of the form were asked to be kind enough to complete the second version in addition; for only one Highly-Able and three Control children was it not possible to obtain the completion of the revised questionnaire. In these four cases information from the first edition of the form has been included in the statistics. Copies of both questionnaires are in Appendix 'C'.

Like the children's questionnaire, the parents' questionnaire has been designed to cover different areas of the child's life experience. These will be examined under the following headings:-

1) physical facts regarding the child,
2) parents' opinions of their child's attitudes to school life,
3) parental views on their child's friendship patterns,
4) information regarding the child's chosen home activities.

1) Physical Considerations

The birth positions of 96% of the 73 Highly-Able children and 87.5% of the 64 Control children revealed differences in the proportions of first-born children in the two Groups. As may be seen from Table 7/7, 55% of the Highly-Able as against 36% of the Control Group were in this category - the difference in the proportions being shown by the chi-square test to be significant $(p<.05)$. The percentages of the second - and third-borns among the Highly-Able were necessarily smaller than for the Control Group.

TABLE 7/7 SAMPLE CHILDREN'S POSITION IN FAMILY

Position in Family	Number		Percentage	
	Highly-Able Group	Control Group	Highly-Able Group	Control Group
First born	40	23	55	36
Second "	20	19	27	30
Third "	8	12	11	19
Fourth "	2	2	3	3
No Information	73	64	100	100.5

The parents' replies indicate the physical health of the Highly-Able Group to be superior to that of the Control pupils since 60% were said to enjoy 'Very Good Health', as against 31% of the latter Group. None of the sample children are shown to have either 'Fair' or 'Poor health.

TABLE 7/8 CHILDREN'S SCHOOL ATTENDANCE ACCORDING TO PARENTS

(All values percentages)

GROUP		ABSENCE DURING THREE SCHOOL TERMS				
	None	Up to one week	Up to one month	Over one month	No Information	Total %
Highly-Able	18	45	29	4	4	100
Control	22	36	34	-	8	100

2) Parental Views on their Child's Attitude to School

Table 7/8 shows the parents' estimates of their child's liking for school. The replies for 71 Highly-Able pupils indicate that almost two-thirds of their parents believed their children liked school 'Very Much', whilst nearly a half of the parents of the 59 Control children did so. The chi-square test shows the difference

TABLE 7/8 PARENTS' VIEWS ON CHILD'S LIKING FOR SCHOOL

PARENTAL VIEW	NUMBER		PERCENTAGE	
	Highly-Able Group	Control Group	Highly-Able Group	Control Group
Very Much	47	31	64	48
Fairly Well	19	22.5	26	35
Not Much	5	5.5	7	9
Not at all	-	-	-	-
Hates it	-	-	-	-
Don't Know	-	-	-	-
No Inform.	2	5	3	8
TOTALS	73	64	100	100

as significant ($p<.01$). The position of the two Groups is reversed as regards the parents' answers for the alternative 'Fairly Well' as only just over one quarter of the Highly-Able parents selected this option while more than one-third of the Control pupils' parents did so. There is a small difference between the 7% in the first Group, and 9% in the second Group selecting 'Not Much' as their answer. No parent replied that their child did not like school, nor that they did not know his or her attitude.

The parents were asked to name the parts of the school day they believed their child liked from a list of alternatives included in Table 7/9. A sub-section to this enquiry on the questionnaire invited them to specify from among their selections the one or more parts of the day their child preferred most. The request was phrased in this manner so that the parents were not forced to select only one option. However, as a result, there are differences in the numbers of parts of the day marked as being liked. In order to prevent the preferences of some children being over-represented in the tables, one 'unit of choice' has been allocated to each child. If a parent has marked three parts of the day, only a third of a 'choice unit' has been included under each of the three headings. Similarly, where a parent has marked two parts of the day as being the most liked, half a unit has been entered under each heading.

Table 7/9 shows a large proportion of both Groups as reported to favour 'Being in the Class-room' and 'Play-time'. 30.8% of the Highly-Able Groups, as against 25.4% of the Control Group, were thought to favour working in the class-room; the greater

TABLE 7/9 PARENTS' VIEWS: CHILD'S PREFERRED PART OF SCHOOL DAY

(in 'Choice-Units')

HIGHLY-ABLE GROUP	Working in Class-room	Hall for Music, Singing, Drama, Film Etc.	Play-time	Sport and/or swimming	After school clubs in School	Total choice Full Units
Preferred Part of School Day	16.88	12.20	15.25	11.90	3.73	59.96
Most Preferred Part of School Day	4.77	1.03	2.08	2.08	0.33	10.29
TOTAL OPTIONS	21.65	13.23	17.33	13.98	4.06	70.25
Percentage of Options	30.81%	18.83%	24.66%	19.90%	5.77%	100%
CONTROL GROUP						
Preferred Part of School Day	11.80	8.10	14.88	9.13	1.10	45.01
Most Preferred Part of School Day	2.42	1.25	3.83	3.58	0	11.08
TOTAL OPTIONS	14.22	9.35	18.71	12.71	1.10	56.09
Percentage of Options	25.33%	16.66%	33.35%	22.66%	1.96%	100%

NOTE: Missing Information

HIGHLY-ABLE GROUP:-
No Quest.returned for two children.
No reply to this question on one form.

CONTROL GROUP:-
No Quest.returned for five children.
No reply to this question on three forms.

preference given to these two options is, however, reversed in the case of the Control Group, 'Play-time' being more often quoted for them than being in the class-room.

Few children in either category were said to have had a preference for 'After School Clubs in School', but this may reflect the lack of general availability of such activities in schools. There is, however, a marked difference between the responses of the parents of the two Groups regarding the popularity of such after school activity, approximately three to one choice units being specified on behalf of the Highly-Able children as compared with those in the Control Group.

There is little difference in the proportions of the two categories choosing 'Being in the Hall, etc.', 'Sport and/or Swimming' and 'Play-time', but a higher percentage of the Highly-Able's parents name the former alternative, while relatively more of the Control parents specify 'Sport and/or Swimming'.

(i) Curriculum Preferences: The parents' views were requested regarding their off-springs' preferred areas of the school curriculum. The main purposes of this question were to:-

a) compare the responses of the parents of the two Groups of children, and

b) see to what extent the parents' replies varied from those of their children who were asked similar, although not identical, questions in their questionnaire.

The latter comparison is dealt with in the next chapter when the three sets of questionnaires are considered in relation to each other (p. 351).

The parents were asked to indicate on a list of twelve activities, covering the curriculum in the majority of primary schools, those areas of school-work their children were normally thought to prefer - and then to name additionally the options their off-spring favoured most. The choices made by the parents are shown in Table 7/10.

For the 71 Highly-Able children for whom questionnaires were returned, 852 represents the maximum possible 'likes' which might have been indicated - similarly, for the 59 Control children for whom forms were returned, there were 708 'likes' available. The ratio of stated to possible 'likes' for the Highly-Able Group is 1 : 1.80 while for the Control Group it is 1 : 2.01 indicating that the parents of the former Group believed their children had more 'likes' among the curriculum activities than did those of the Control Group. This finding is in line with a former one, (Table 7/8) indicating that a larger proportion of the parents of the Highly-Able children believed their off-spring liked school 'Very Much' compared with the views of the Control children's parents.

The 'Total Likes' column of Table 7/10 shows 'Reading' and 'Mathematics' were thought to be the preferred occupations by the parents of the Highly-Able - followed after an interval by 'Project', 'Creative Writing' and 'Outdoor Games & Sport' in descending order of popularity. The least-favoured activities were thought to be 'Social Studies', 'Free Activity' and 'Craft & Needlework'.

'Reading' and 'Outdoor Games & Sport' are the most frequently reported 'likes' for the Control Group - followed by 'Project' and

TABLE 7/10 CHILDREN'S CURRICULUM AREA LIKES ACCORDING TO THEIR PARENTS

CURRICULUM AREA	HIGHLY-ABLE GROUP						CONTROL GROUP					
	EMPHATIC LIKES		OTHER LIKES		TOTAL LIKES		EMPHATIC LIKES		OTHER LIKES		TOTAL LIKES	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
READING	30	23	35	10	65	13.74	18	19	25	10	43	12.28
CREATIVE WRITING	14	11	30	9	44	9.3	7	7.5	22	9	29	8.28
MATHS	26	20	32	9	58	12.26	7	7.5	22	9	29	8.28
PROJECT	13	11	37	14	50	10.57	13	15	27	14	40	11.43
SOCIAL STUDIES	1		12		13	2.74	1		10		11	3.14
FREE ACTIVITY	6	5	25	7	31	6.55	1	1	27	10.5	28	8
PAINTING	6	5	38	11	44	9.3	6	6.5	36	14	42	12
POTTERY	3	3	27	12.5	30	6.34	4	6.5	16	13	20	5.7
CRAFT & NEEDLEWORK	1		16		17	3.59	2		18		20	5.7
MUSIC & SINGING	11	9	31	9	42	8.87	11	12	20	8	31	8.8
MUSIC & MOVEMENT	3	2	28	8	31	6.55	4	4	11	4	15	4.3
OUTDOOR GAMES & SPORT	14	11	34	1[illegible]	48	10.14	19	20	23	9	42	12
TOTAL Choices Made	128	100	345	99.5	473	100	93	99	257	100.5	350	100

Highly-Able Group:

Total 'Likes' possible for 71 quest. returned	......71 x 12 = 852
Total stated 'Likes' " " " "	.....473 = 55.5%
Total 'Emphatic Likes' " " " "	.....128 = 15.0%

Control Group:

Total 'Likes' possible for 59 quest. returned	..... 59 x 12 = 708
Total stated 'Likes' for " " "	.....350 = 49.4%
Total 'Emphatic Likes' " " " "	..... 93 = 13.1%

'Music & Singing'. The least-favoured activities for the Control pupils were shown as 'Social Studies', 'Free Activity', 'Craft & Needlework', 'Pottery' and 'Music & Movement'.

A comparison of the total 'likes' for the curriculum areas considered shows that the 'Three R's' were thought to be held in greater favour by the Highly-Able, while 'Outdoor Games & Sport' were believed to be the main choice of the Control Group. However, Mathematics is shown as being the chief option parents considered as markedly less favoured by the Control Group; it received only 8.2% of the selections while the value for the Highly-Able Group was 12.2% - the chi-square test showing the difference to be significant ($p<.01$). There is also a reported difference in the popularity of Reading significant at the $p<.01$ level - and again for the 'Three R's' combined.

Turning to the 'emphatic likes' columns, it may be seen that the numbers involved are much smaller, as might be expected. For the Highly-Able children the parents have shown an 'emphatic like' for 128 selections while for the Control Group the corresponding number is 93. Thus the parents of the Highly-Able pupils marked 15% of the available options here, whereas the Control children's parents named only 13%, indicating that, in their views, the Highly-Able children have proportionately more 'emphatic likes' as well as 'total likes' than do the Control children.

The distributions of 'emphatic likes' covering the twelve curriculum areas ascribed to the children show a marked difference between the two Groups. The chief variation is once more in respect of Mathematics ($p<.01$) in particular and for the 'Three R's' combined ($p<.01$) - but the difference for Reading by itself is not significant. Although the absolute numbers of pupils involved is small for both Groups, it may be noted that the 6.5% of the Control pupils thought to have a marked liking for 'Pottery' and 'Craft & Needlework' is more than double the 3% for the Highly-Able Group.

One may conclude that, in their parents' opinions, there is a difference between the patterns of the children's chief preferences, particularly regarding Mathematics and the 'Three R's' combined, and that the Highly-Able children's 'likes' are spread more widely over the curriculum.

(ii) Parental Assistance with School-work: Enquiries were made on the parents' questionnaire as to whether additional teaching to assist with school-work had been given to their child at home.

The questions regarding home instruction related to a list of five school subjects and enquired for which, if any, the child received:-

(a) a regular weekly hour's teaching,

(b) an occasional, monthly ½-hour's teaching.

Thus the form provides for the recording of a maximum of five hours per week plus five half-hours per month home tuition for each child. For the 71 Highly-Able pupils for whom questionnaires were returned, there is an upper limit of 355 hours regular weekly instruction plus 355 ½-hours of occasional monthly teaching set by the batch of forms; the corresponding values for the 59 Control children involved, are 295 weekly hours plus 295 ½-hours.

TABLE 7/11(a) PARENTAL ASSISTANCE WITH CHILD'S SCHOOL WORK

REGULAR WEEKLY TEACHING

TEACHING OUTSIDE SCHOOL (REGULARLY ABOUT ONE HOUR PER WEEK)	HIGHLY-ABLE GROUP TEACHING HOURS			CONTROL GROUP TEACHING HOURS			SIGNIFICANCE p< (Chi-square test)
	Possible	Given	Possible Total Hours %	Possible	Given	Possible Total Hours %	
Reading	71	6.2	8.73	59	15	25.42	.05
Handwriting	71	2.2	3.09	59	8	13.55	.05
Composition or Stories	71	1.2	1.69	59	7	11.86	.05
Spelling	71	5.2	7.32	59	12	20.33	.05
Maths	71	3.2	4.50	59	9	15.25	.05
TOTAL	355	18	5.07	295	51	17.28	.001

TABLE 7/11(b) PARENTAL ASSISTANCE WITH CHILD'S SCHOOL WORK

(Occasional Monthly Periods)

TEACHING OUTSIDE SCHOOL (OCCASIONALLY ABOUT ½-HOUR PER MONTH)	HIGHLY-ABLE GROUP TEACHING ½ HOURS			CONTROL GROUP TEACHING ½ HOURS			SIGNIFICANCE p< (Chi-square test)
	Possible	Given	Possible Total Hours %	Possible	Given	Possible Total Hours %	
Reading	71	2	2.81	59	18	30.5	.001
Handwriting	71	6	8.45	59	9	15.25	-
Composition or Stories	71	3	4.22	59	5	8.47	-
Spelling	71	9	12.67	59	17	28.81	.05
Maths	71	10	14.08	59	15	25.42	-
TOTAL	355	30	8.45	295	64	21.69	.01

The parents' replies regarding the amount of additional instruction their children received are shown in Tables 7/11 (a) and 7/11 (b). The Highly-Able pupils' parents indicated (Table 7/11 (a) that their children were taught 5.0% of the regular weekly hours for which the questionnaire provides, while the corresponding value for the Control pupil is 17.28%. For the 'occasional monthly ½-hours' the calculated values are 8.45% for the Highly-Able Group and 21.69% for the Control Group. Differences in the amount of regular weekly home tuition, and of the occasional instruction, received by the two Groups of children are each significant at the $p < .001$ level, the proportion of utilised teaching time for the regular weekly and occasional monthly periods is notably lower for the Highly-Able pupils as compared with the Control Group. The calculated values are as follows:-

	HOME TUITION PERIODS UTILISED:	
	Regular Weekly	Occasional Monthly
Highly-Able Group:	5.07%	8.45%
Control Group:	17.28%	21.69%

The questionnaire gives 'Reading', 'Handwriting', 'Composition or Stories', 'Spelling' and 'Maths' as the five subject alternatives, the terms used being those most commonly adopted by parents.

In respect of both a regular weekly hour, and an occasional monthly half-hour, for each of the options the number of teaching periods stated by the parents is in all cases smaller for the Highly-Able than for the Control Group. As may be seen from Table 7/11 (a) the largest difference between the two Groups is for Reading but the variation is sufficient to be significant at the $p < .05$ level for each of the five subjects and for the two distributions as a whole, at the $p < .01$ level. As regards Table 7/11 (b), there is a very large difference for tuition in

Reading ($p<.001$) and a significant difference for spelling at the $p<.05$ level. The variations for Maths., Handwriting and Composition & Stories are all smaller but there is again a significant difference at the $p<.01$ level when the two distributions of the amount of extra occasional ½-hours tuition given to the children are taken as whole. An inspection of the pairs of distributions reveals that the chief source of the differences is the relatively greater attention paid to Reading by the Control parents, and the fact that more home tuition sessions are given to their children.

Another question on the parents' questionnaire enquired as to whether their child was given any other help with school-work. The responses here show the reverse pattern as between the Highly-Able and Control children. The reply was in the affirmative for 61 of the Highly-Able as against 38 of the Control pupils while the corresponding negative replies were 6 and 15 respectively. The difference here between the two Groups is significant at the $p<.01$ level.

The parents' replies covered a wide scope when asked what was the form of assistance, other than direct teaching, which they gave their children with their school-work.

As may be seen from Table 7/12, two-thirds of the Highly-Able children's parents indicated that they gave their children general help and encouragement, particularly with the use of the library, obtaining books for them, by assisting them with the collection of materials for projects, and by answering the children's questions. Almost a fifth of the parents gave more specific help with their children's school-work, while only 8.5% did not help their off-spring

TABLE 7/12 PARENTAL HELP GIVEN ON SCHOOL-WORK

(Other Than Teaching)

Specific Help:	**HIGHLY-ABLE CHILDREN**		**Specific Help:**	**CONTROL CHILDREN**	
	No.	**%**		**No.**	**%**
Reading	2	18.3	Reading	1	8.5
Spelling	3		Homework	4	
Maths & Science	3		**Possibly Specific Help:**		
Maths & English Work-Books	1		Help given when necessary	6	10.2
Latin one hour p.w.	1		**General Help:**		
Stimulation for School entrance exam.	1		Assistance with Project	12	45.8
Check Homework	2		Help when asked	9	
General Help:			Encouragement	2	
General encouragement in school subjects	22	67.6	Explain things	1	
Assistance with Project	11		Keep supplied with reading and art equipment	1	
General advice and encouragement	6		Visits to museums, advice on books	1	
Mental Arithmetic as a game	1		Bed-time story nightly	1	
Answer questions	3				
Discussion	2				
Help find out	3				

No. of Parents providing help	61	85.9	No. of Parents providing help	38	64.5
No. Replying 'No'	6	8.5	No. Replying 'No'	13	22.0
No. not replying	4	5.6	No. not replying	8	13.5
TOTAL	71	100.0%	TOTAL	59	100.0%

in this way.

A larger proportion of the Control children's parents, just over a fifth, gave a negative reply to this question. However, two-thirds of the Control parents indicated that they did provide assistance of a general nature which took the form of answering questions, supplying general encouragement and help with the children's project work. Four parents supervised home-work one assisted with reading, and a further six provided aid but its precise form is unclear.

The parents' replies on additional teaching and other assistance with their children's learning indicated an unexpected difference in the approaches of the two Groups of parents to their children's school-work, which is supported by the statistical evidence. The reasons for such differences are unclear: it may be that the two Groups of parents are drawn from populations with varying sub-cultures in respect of education in spite of the efforts made to obtain children for the Highly-Able and Control samples paired on socio-economic background. Alternatively, and perhaps more probably, the Highly-Able children evoke from their parents a different response than do their average-bright contemporaries.

3) Parental Views of their Children's Social Relationships.

There were two main questions in this section. The first was concerned with the parents' views as to whether their child had a particular friend, or belonged to a group of friends. The second question sought to elicit the parents' opinions as to whether their off-spring favoured the companionship of other children of the same age or preferred those who were either older or younger; or alternatively, whether their children opted for the company of adults. The parents' replies are set out in Tables 7/13 and 7/14.

TABLE 7/13 PARENT VIEWS ON THEIR CHILDREN'S SOCIAL RELATIONSHIPS (1)

	QUESTION						
	Does your child have a particular friend.		Is your child one of a group of friends	Has he/she no child friends.	Don't Know	No Information	Total
	At School	Elsewhere					
HIGHLY-ABLE GROUP							
Replies: No.	16	4	44.5	5.5	0	3	73
%	22	5.5	61	7.5	0	4	100
CONTROL GROUP							
Replies: No.	14	4	38	2	1	5	64
%	22	6	59	3	2	8	100

Note: One parent ticked two options. Accordingly 0.5 has been entered under each of the two headings concerned.

Approximately equal proportions of the parents of both Groups indicated that they believed their child to be:-

(a) one of several friends at school (60% approximately), or that,

(b) their child had a special friend at school (22%).

The main difference found here was between the 7.5% of the Highly-Able pupils' parents as compared with the 3% of those of the Control Group who considered that their off-spring had no particular friend. There is a difference here which might be investigated in a subsequent enquiry, since although the numbers are too small to be statistically

TABLE 7/14 PARENT VIEWS ON THEIR CHILDREN'S SOCIAL RELATIONSHIPS (2)

	QUESTION							
	Does your Child Prefer to be with Children							
	Children of him/her own age	Children one year or more older	Children one year or more younger	Adults	Don't Know	Very Variable	No Inf.	Total
HIGHLY-ABLE GROUP								
Replies: No.	21.5	20.5	3	1	4	18	5	73
%	29.5	28	4	1	5.5	25	7	100
CONTROL GROUP								
Replies: No.	32.5	8.5	1.5	2	0	12.5	7	64
%	51	13	2	3	0	19.5	11	99.5

Note: Where parents have ticked two options, 0.5 has been entered under each of the two headings concerned.

significant, yet, according to the parents' opinions, there are apparently two-and-a-half times as many isolates found among the Highly-Able children as compared with the Control children.

The great majority of both Groups of parents were of the opinion that their off-spring preferred the company of other children rather than that of adults - but over twice as many of the Highly-Able children's parents as compared with those of the Control pupils believed that their off-spring preferred the company of peers a year or more older than themselves ($p < .05$). Doubt as to the company preferred by their off-spring was expressed for 30% of the Highly-Able and 20% of the Control children, a variation between the two Groups which seems noteworthy. Only one Highly-Able and two Control children were thought by their parents to prefer adult company.

4) Parents' Replies on Children's Home Interests

The parents were requested to tick those of the following activities which they thought their children enjoyed at home:-

Watching TV: Reading: Making Something: Creative Writing:
Drawing & Painting: Looking After Pets: Doing Puzzles:
Mathematical Puzzles: Music: Dancing: Drama: Swimming &
Outdoor Games, Sport.

They were also asked to specify those particular activities in which their children had a special interest, and to describe the type of play in which their off-spring frequently engaged. Extra space was left for additional comments or remarks the parents might choose to make.

Table 7/15 sets out the parents' replies on their children's main home interests and it will be seen that according to the parents the four special interests of both Groups of children are 'Watching TV', 'Reading', 'Making Something' and 'Swimming & Outdoor Games' but the order of popularity in which these are specified differs between the two Groups.

'Reading' is given as the most popular option for the Highly-Able Group, it being specified in 27% of the replies; but it is given only for 13% of the answers referring to the Control Group. The variation here is noteworthy at $p<.01$ level of confidence. 'Swimming & Outdoor Games', 'Making Something', and 'Watching TV' are the Highly-Able children's main home interests given in descending order of importance. The rank order of the Control children's home activities were shown as being:- 'Swimming & Outdoor Games, 'Watching TV', 'Reading' and 'Making Something'. It is worthy of note that,

TABLE 7/15 PARENTS' REPLIES ON CHILDREN'S HOME ACTIVITIES

MAIN INTERESTS

ACTIVITY	No. of options made for:-		% of Options made for:-	
	Highly-Able Group	Control Group	Highly-Able Group	Control Group
Watching TV	16	17	14.6	20.2
Reading	30	11	27.3	13.1
Making Something	17	8	15.5	9.5
Creative Writing	3	2	2.7	2.4
Drawing & Painting	4	3	3.6	3.6
Looking After Pets	1	2	.9	2.4
Doing Puzzles	4	1	3.6	1.2
Mathematical Puzzles	4	-	3.6	-
Music	3	6	2.7	7.1
Dancing	1	3	.9	3.6
Drama	2	-	1.8	-
Swimming & Outdoor Games, Sport	25	31	22.7	27.0
TOTAL	110	84	99.9%	100.1%

Note: Highly-Able Group

Total recordable 'Main Interests' - 71 x 12 = 852
" enumerated " " = 110
that is, 12.9% of total of 852

Control Group

Total recordable 'Main Interests' - 59 x 12 = 708
" enumerated " " = 84
that is, 11.9% of total of 708

although 'Swimming & Outdoor Games' were reported by the parents to be important main interests for the Highly-Able Group in absolute terms, both these activities were shown to be less popular with them than with the Control Group.

Few parents showed either 'Music' (Highly-Able three, Controls six) or 'Dancing' (Highly-Able one, Controls three) as a main interest but although the numbers involved are very small it may be noted that the proportions of Highly-Able children to Control pupils thought to have a special interest in these occupations was in the ratio of 1 : 2 and 1 : 3 respectively. For the remaining occupations listed, 'Creative Writing', 'Drawing & Painting', 'Looking after Pets' and 'Drama' - the values were all small and there was little difference between them for the two Groups.

No information was obtained as to the types of television programmes preferred by the sample children, nor as to the type of music or dancing in which the children were believed to be interested or whether they practised or merely appreciated the performances of others in these arts.

Table 7/15 also shows the total number of 'Main Interests' specified for the Highly-Able Group to be 110 and for the Control children 84. Since the maximum options available here are 852, (71 x 12) and 708 (59 x 12), it is apparent the selections made for the Highly-Able Group represented 12.9% of the maximum available and that the corresponding value for the Control Group was 11.9%. These results appear to indicate that the Highly-Able children engage in few more pursuits at home than do the Control children.

The residual lists of 'General Home Interests' reported by the parents as being held by their off-spring are shown in Table 7/16. The chief difference between the two Groups here according to the parental selections were that 'Music' received twice the percentage of nominations for the Highly-Able as for the Control Group. At the same time, 'Watching TV' was shown as the most popular 'General Home Interest' held by the Highly-Able Group followed by 'Reading' and 'Making Something'. For the Control Group the three largest selections in decreasing order of importance were 'Making Something', 'Watching TV' and 'Reading'. Although

TABLE 7/16 **PARENTS' REPLIES ON CHILDREN'S GENERAL HOME INTERESTS**

ACTIVITY	No. of Children		% of Group	
	Highly-Able Group	Control Group	Highly-Able Group	Control Group
Watching TV	50	38	14.16	15.3
Reading	37	32	10.48	12.9
Making Something	38	39	10.77	15.7
Creative Writing	23	14	6.52	5.6
Drawing & Painting	31	27	8.78	10.8
Looking after Pets	23	26	6.52	10.4
Doing Puzzles	33	22	9.35	8.8
Mathematical Puzzles	20	5	5.67	2.0
Music	34	13	9.63	5.2
Dancing	19	8	5.38	3.2
Drama	17	7	4.81	2.8
Swimming & Outdoor Games, Sport	28	18	7.93	7.2
TOTAL	353	249	100.00	99.9

more popular than with the Control Group, 'Drama' is the most rarely named occupation for the Highly-Able children - likewise, 'Music' was the least-favoured for the Control children.

Table 7/17 shows the frequencies with which each of the listed activities were selected by the two sets of parents. These numbers represent the sum of the frequencies recorded under 'Main Interests' in Table 7/15 and 'General Interests' in Table 7/16. As may be seen from Table 7/17, the parents of the Highly-Able children utilised 54% of the total options for home pursuits provided by the questionnaire, whereas for the Control Group the corresponding value was 49% These percentages reveal a greater breadth of reported interests for the Highly-Able compared with the Control children, the difference here being statistically significant at the $p<.01$ level.

When the sums of the frequencies for the 'Main' and 'General Interests' are considered as in Table 7/17, the larger values involved show additional significant differences between the Highly-Able and Control children. The variation between the 94.3% of the Highly-Able and 72.9% of the Control children said to read at home is highly significant ($p<.001$). Additionally, in respect of 'Mathematical Puzzles', there is marked difference in the number of children in the two categories ($p<.001$) although this is not the case for the related activity 'Doing Puzzles'. The reported greater popularity of 'Drama' and 'Music' with the Highly-Able Group is sufficient to be noteworthy at the $p<.05$ level. In the case of 'Music' there is a reversal in the size of the proportions of the Highly-Able and Control children involved; when the 'Main' and 'General Interests' are combined, the Highly-Able percentage becomes the larger, whereas previously, when 'Main Interests' only were under consideration, it

TABLE 7/17 PARENTS' REPLIES REGARDING EXTENT OF CHILDREN'S HOME ACTIVITIES

ACTIVITY	No. Undertaking Activity		% of max. taking part in activity		Significance of Differences between proportions of max. (Chi-square test)
	Highly-Able Group	Control Group	Highly-Able 71 children	Control 59 children	
Watching TV	66	55	92.6	93.2	-
Reading	67	43	94.4	72.9	.001
Making Something	55	47	77.5	79.7	-
Creative Writing	26	16	36.6	27.1	-
Drawing & Painting	35	30	49.3	50.8	-
Looking After Pets	24	28	33.8	47.5	-
Doing Puzzles	37	23	52.1	39.0	-
Mathematical Puzzles	24	5	33.8	8.5	.001
Music	37	19	52.0	32.2	. 05
Dancing	20	11	28.2	18.6	-
Drama	19	7	26.8	11.9	. 05
Swimming & Outdoor Games, Sport	53	49	74.6	83.1	-
TOTAL	463	333			

Note:

Highly-Able Group:- Max. Recordable Interests = 852
of which 463 utilised - 54.3%

Control Group:- Max. Recordable Interests = 708
of which 333 utilised - 47.0%

Significance of differences between pps. of max. p<.01

was smaller. The variation in the popularity of 'Dancing' between the two Groups is not significant and neither are the differences in the remaining home pursuits options.

It is noteworthy that there is a pattern presented by the two sets of ratios referring to the choices made by the children's parents - the one for reported popularity of their off-springs' home pursuits, the other for their preferred areas of the school curriculum. The persentages are repeated below:-

	Proportion of Recordable Home Pursuits Utilised.		Proportion of Recordable 'Likes' Utilised in School Curriculum	
	Main Interests	Total Interests	Emphatic Likes	Total Likes
Highly-Able Group	12.9%	54.3%	15.0%	55.5%
Control Group	11.9%	47.0%	13.1%	49.4%

In all four cases, in respect of the home 'Main' and 'Total Interests' and as regards the school curriculum 'Emphatic Likes' and 'Total Likes', the spread of the Highly-Able Group's vista of interests is shown to be more extensive than is the case for the Control Group. The clearness of the pattern which has emerged is perhaps surprising bearing in mind the subjectivity of questionnaire forms of this type.

(iii) Types of Play:

According to their parents, the play of both Sample Groups covered a wide spectrum of activities which have been classified in Table 7/18. There was a general similarity in the play patterns displayed, the chief differences being in the intellectual quality of the play and variations of emphasis within the categories listed.

The chief contrasts in the children's recreational activities reported are found in categories 8) and 9) of Table 7/18 where such

TABLE 7/18 TYPES OF PLAY

CATEGORY	HIGHLY-ABLE GROUP	CONTROL GROUP
1) Imaginary	Dressing-up, Making Plays, Historical, Schools, Shops, Dolls, Toy Soldiers.	Play Battles with Toy Soldiers Dressing-up, Families, Schools, Spies and Space, Inventing, Talking with Friends.
2) Environ-	Gardening, Nature Study, Feeding Birds Daily, Bird-Watching, Insects, Fishing, Exploring Rivers and Streams, Fossils.	Gardening, Bird-Watching, Natural History, Fishing, Walking & Exploring, Care of Dog, Hamster, Tortoises.
3) Technical	Aircraft Models, Meccano, Dynamic performance of paper darts, Making Electrical Gadgets, Making elaborate road systems, Construction, Science & Technology, Photography.	Model-aircraft building. Building with bricks, Playing with cars, lorries, Road-works, Building Sites.
4) Categorisation	Stamp-collecting with use of Catalogues, Road Signs, Intellectual use of Time-Tables and Maps.	Collecting stamps, flowers, Stories, identification of animals, birds, insects, bones, Drawing Maps.
5) Music	Playing Records.	Playing Records, Singing, Anything musical.
6) Indoor Games	Lego, Monopoly, Scrabble, Chess, Draughts, Jig-Saws, Origami, Spirography, Playing cards, Drawing, Painting, Kit-painting, Reading Comics, Table Tennis.	Lego, Monopoly, Jig-Saws, Cleudo, Origami, Card Games, Drawing, Painting, Scrap-books, Using glue, Cardboard, sellotape, etc. Cutting-out, Making Dolls Clothes, Gymnastics, Badminton.
7) Outdoor Activities	Football, Tree-Climbing, Adventure Games, Scouts, Guides, Tennis, Swimming, Cycling, Horse-riding.	Football, Tree-Climbing, Climbing-Frame, Adventure Playground, Sand-Pit, Scouts, Cubs, Brownies, Swimming, Cricket, Sports Activities, Ball Games, Chasing Games, Skipping, Bike, Horse-riding, Building Houses, Camps and Dens, Camping, Boating.
8) Intellectual	Debating Society, Discussing Group, Reading History books, Reconstructing 2nd World War Battle Scenes. "Very little time playing. Concentrating on thinking on book he would like to write". "Reading, studying and thinking on his current pet subjects".	Historical things, Making little books. Writing Stories.
9) Working	Shopping.	Mending Electric Plugs, Household Maintenance, Looking aft small children, Cooking, Helping in Shop, Doing small jobs to get money.

interests as:- 'Debating Society', 'Discussion Group', and 'Reading, Studying and Thinking', are not matched by similar mental reflections on the part of the Control Group. The latter Group's stated interest in 'Making Little Books', and 'Writing Stories', appears to indicate less intellectual perspicacity but they seem to be more practical and helpful in under-taking small jobs, either voluntarily or for pay.

There appears also to be a difference in the level of activities listed under the heading, 'Technical', those occupying the Highly-Able being more advanced and of more scope than similar play by the Control Group. As regards the occupations under 'Categorisation', both Groups are found to engage in making collections, but the Highly-Able children's study of time-tables and maps may again be a similar type of activity but at a higher level than is usual for children in this age group.

Similar imaginary games, which are essentially 'make believe', are played by both Groups of children but appear to be more important for the Control Group. The two sets of children do not apparently differ in their interest in the environment, nor as regards music or indoor games. 'Outdoor Activities' appear to form a larger part of the Control children's recreation and this greater emphasis is in line with that already found under the previous section on 'Home Interests'.

(iv) Parents' General Comments:

The diverse observations made by the parents indicate that the Highly-Able children were not a 'type' but vary widely. Table 7/19

TABLE 7/19 VARIOUS COMMENTS BY PARENTS

(1) Child's Personality and General Characteristics

HIGHLY-ABLE GROUP	CONTROL GROUP
Extrovert, bossy, rarely bored.	Talks readily to herself and strangers. Expressive in movement and music.
Very sociable with all ages: likes conversation.	Mainly interested in playing with others.
An all-round personality with a lively interest in most things.	Needs other's company.
Enjoys most things, very helpful at home.	Likes afternoons and evenings best with group of friends; does not like being alone.
Enthusiastic about everything undertaken.	Has great ability to concentrate - impatient with those who are not quick.
Loveable, demanding, excitable, agile, sleepless.	Thoroughly enjoys all aspects of life.
Always occupied, reliable.	Friendly nature, gets on with all ages.
Likes to organise.	Likes activity.
Enquiring disposition.	Untidy.
Enjoys 'research'.	Reads sports' pages of newspaper.
Impatient of expression in practical form.	Likes doing nothing specific; prefers children one year older.
Likes to be on his own - gets on with people of all ages.	Seldom initiates play, but is an enthusiastic follower.
Capable, very critacal of others.	Quiet and self-contained; does not tell about school.
Home and school kept separate, parents told little of school interests.	A quiet child with plenty of patience.
Basically a loner, but flexible.	Enjoys his own company.
A quiet, serious child.	A shy boy who needs pushing.
Prefers own company.	Reticient and dreamy.
Slightly introverted.	
Easily bored.	
No class-friends.	

(2) Social and Psychological Adjustment

HIGHLY-ABLE GROUP	CONTROL GROUP
Likes helping at home.	Settling down after frequent changes in school - parents in Forces.
School best part of day.	

continued on next page ....

TABLE 7/19 continued.

(2) Social and Psychological Adjustment	
HIGHLY-ABLE GROUP	CONTROL GROUP
Was unhappy at school, but now happy.	Likes teacher's individual attention.
Content to go to school but usually would prefer to stay at home.	Holds back if not sure is right.
School curriculum comes nowhere near needs.	A feeling that the teacher picks on him has deterred him from going to school.
Regular tantrums.	Likes to work on his own.
	Likes to play alone.
(3) Physical Circumstances	
Eats and drinks well.	Adopted.
Adopted.	Diabetic.
One parent.	Asthma.
Unusually clumsy - difficulty in co-ordinating hand and eye.	Grandparent dying in house with terminal disease.
Physical action of writing difficult.	
Brain damage at birth.	

attempts to classify the parents' contributions into continuums relating introvert-extrovert personality type, the degree of social and psychological adjustment and according to the extent of physical disabilities. Observations covering a number of topics concerning a particular child have been divided between the appropriate headings. Frequencies for repeated remarks have not been given because of the difficulty of interpreting and classifying exactly the parents' meaning in their comments - with the exception of the statements made relating to isolates and preferred teaching method which are shown in Table 7/20.

The Highly-Able desingated isolates consisted of five

TABLE 7/20 PARENTS' UNSOLICITED COMMENTS ON CHILD'S PREFERRED MANNER OF WORKING (or PLAY)

	HIGHLY-ABLE CHILDREN	CONTROL CHILDREN
1) **Isolates:**		
Prefers to do school-work on own ..	3	2
Prefers own company	3	-
Prefers to play alone	-	1
2) **Teaching Method:**		
Prefers teacher teaching whole class	-	9

juniors and one infant. In most cases the parents also stated that their child related well with people. Two Control infants were said by their parents to have favoured working on their own while another was reported as having liked to play alone. Nine of the Control children's parents held that their children preferred the teacher addressing the class as a unit as a method of learning - no such remark was made regarding any of the Highly-Able pupils.

The parents volunteered their remarks regarding teaching and working methods there being no question on these topics on the questionnaire. Accordingly, it is surprising that thirteen parents, (Highly-Able two, Controls eleven) elected to make comments on these points. The children's questionnaire which did include a question upon the pupils' preferred method of working was completed in school and was not seen by the parents.

SUMMARY - PARENTS' QUESTIONNAIRES

Completed questionnaires were returned for 95% of the sample. The greater proportion of the children were said to have had good health, a high school attendance rate, to have liked school and none was reported as disliking it. Being in the classroom and play-time were the most popular parts of the school-day, the respective proportions being different for the two Groups.

Reading and Mathematics were reported as the most favoured and Craft and Needlework and Social Studies as the least-favoured curriculum areas by the Highly-Able Group. The Control Group were said to have preferred most Outdoor Games & Sport and Reading; their least-favoured activities were Social Studies, Free Activity and Craft & Needlework. The extent of the curriculum 'likes' of the Highly-Able were stated to exceed those of the Control Group.

A third of the Highly-Able and two-thirds of the Control parents provided additional teaching in one or more of the 'Three R's'. Four-fifths of the Highly-Able and two-thirds of the Control parents provided other help with school-work.

Most of the sample had one or more friends but 7.5% of the Highly-Able and 3% of the Control pupils were said to have none. Twice as many Highly-Able as Control children preferred companions older than themselves - 30% of the Highly-Able and 50% of the Controls had friends of their own age.

For the Highly-Able, in descending order, the preferred home activities were said to be Reading, Swimming & Outdoor Games, Watching TV, Reading and Making Something. 7% of the Highly-Able and 1% of the Control Group did puzzles. The Highly-Able Group had a wider span of home occupations. The parents' responses for both Groups were generally consistent as to preferred curriculum areas in school and type of home activities and showed the Highly-Able Group's interests to be wider than those of the Controls both at school and at home.

Similar types of play were engaged in by both Groups but those of the Highly-Able were more intellectual and the Control children were reported more interested in employment. Both Groups engaged in outdoor activities but the extent and variety was greater for the Control children.

Both Groups of pupils were said to possess a variety of personality characteristics, but the Highly-Able often exhibited qualities to greater extremes being described as 'enthusiastic', 'demanding', 'impatient' and 'easily bored'.

A few remarks concerning social and psychological adjustment were made - insufficient curriculum content and regular tantrums were mentioned regarding the Highly-Able children - Control pupils were said to be quiet, to hold back, or to have sought the teacher's attention. The two Groups were not distinguishable regarding physical circumstances.

Differences and similarities between the two Sample Groups are set out in tabular form in Table 7/21.

SUMMARY TABLE 7/21 DIFFERENCES BETWEEN QUESTIONNAIRES RETURNED BY PARENTS OF THE HIGHLY-ABLE AND CONTROL GROUPS.

HIGHLY-ABLE CHILDREN	CONTROL CHILDREN
Physical: 55% were first-born children. 60% enjoyed very good health and 63% were absent a week or less during three school terms.	36% and 30% respectively were first-born and second-born, and another 19% third-born children. 31% had very good health and 58% were absent a week or less during three school terms.
School: 64% were reported to like school very much and another 26% fairly well. The most preferred part of the school day was said to be working in the class-room for 31% and play-time for a further 23%; 6% enjoyed after school clubs.	48% were said to like school very much and another 35% fairly well. 33% were said to prefer play-time most during the school-day, another 25% to favour working in the class-room and 23% sport or swimming. Only 2% were reported to like after school clubs.
Curriculum: One of the 3 R's was named for 53% of the 'emphatic likes' of the children. All the other subject areas were named but the proportions were smaller than in the case of the Control Group with the exception of Free Activity where the low figure of 3% was the larger. For additional 'Other likes' the 3 R's received 28% of the nominations. All the other alternatives are named, the proportions being similar to those for the Control Group with the exception of Music & Movement which received 8% of the nominations.	One of the 3 R's was quoted as an 'emphatic like' in 34% of the nominations. All the remaining curriculum areas were named proportionately more frequently than in respect of the Highly-Able Group with the exception of Free Activity where the proportion was 1% Under 'other likes' the 3 R's were also given 28% of the nominations. Painting is named most frequently with 13% of the nominations. Free Activity received 11%, Music & Movement obtained the low figure of 4%. The proportions for the remaining options are either identical or similar for the two Groups.
Home Teaching: Some home teaching was provided on the 3 R's by 30% of the parents either regularly or occasionally.	66% of the parents provided some extra teaching, either on a regular or occasional basis for one or more of the 3 R's.
Other Help: 86% of the parents assisted their children with projects, answering questions, books and visits.	65% of the parents assisted their children with projects, answering questions, libraries, visits and home-work.

SUMMARY TABLE 7/21 continued.....

HIGHLY-ABLE GROUP	CONTROL GROUP
Friends; 60% of the children were reported to be one of several friends, another 22% to have a special friend. 7.5% of the Group were said to have no friends.	60% were said to be one of several, and a further 22% to have a special friend. 2% of the parents did not know, 3% said their child had no friends.
30% had friends of their own age, 28% were friends with older children; 4% preferred younger children.	The friends of 50% were their own age, but 13% preferred older children; 2% played with younger children.
Home Occupations; Of the children's named 'main interests', 27% were for Reading, 23% for Swimming & Outdoor Games, 16% Making Something, and 15% Watching TV. All the remaining listed activities were included as 'main interests' for a small proportion, the largest of these being 7% for puzzles. 14% for Watching TV was the largest proportion listed additionally under 'other interests'. 11% each were recorded for Reading and Making Something, 10% for Music and 9% for doing Puzzles. The remaining alternatives each took a small percentage of the stated activities.	Swimming & Outdoor Games were given for 37% as the 'main interests', followed by 20% for Watching TV, 13% Reading, and 10% for Making Something. The other listed occupations were followed by small proportions of the Group, the largest being 7% for Music. 16% for Making Something and 15% for Watching TV were the largest proportions of the additional 'other interests'. They were followed by 11% Drawing & Painting and 10% Looking After Pets. The other options each received a small percentage of nominations.

The percentages of the children, participating out of school in the following activities, is indicated by the proportions of the maximum number in the Group.

(Highly-Able 71 = 100%)		(Controls 59 = 100%)	
Reading	94%	Watching TV	93%
Watching TV	93%	Swimming & Outdoor Games	83%
Making Something	78%	Making Something	80%
Swimming & Outdoor Games	75%	Reading	73%
Puzzles	52%	Drawing & Painting	51%
Music	32%	Looking After Pets	48%
Drawing & Painting	49%	Puzzles	39%
Creative Writing	37%	Music	32%
Mathematical Puzzles	34%	Creative Writing	27%
Looking After Pets	34%	Dancing	19%
Dancing	28%	Drama	12%
Drama	27%	Mathematical Puzzles	9%

Additional Volunteered Comments by Parents:

Six children preferred to do school0work alone.	Nine children preferred class to be taught as a unit. One child preferred to work, and one to play, alone.

III - TEACHERS' QUESTIONNAIRE

The generous help contributed by the children's teachers resulted in 100% completed questionnaires being returned for the sample. The replies are considered in sequence under five headings and refer to the child's:-

1) Physical circumstances relative to that of the school class.
2) Physical development, health and school attendance.
3) Standard and nature of performance in school-work.
4) Social relationships within the school class.
5) Teachers' general comments.

A copy of the questionnaire used will be found in Appendix 'D'.

1) Child's Physical Circumstances

Confirmatory data were requested on the child's sex and chronological age. The latter for over half the sample (Gifted 56%, Control 59% was reported as being average for the school classes involved while similar proportions of both Groups (Highly-Able 12%, Controls 14%) were about six months older, or six months younger (Highly-Able 18%, Controls 17%). There is a marked similarity between the proportions of each of the two Groups in these three categories. However, there was an obvious difference between the seven of the Highly-Able (9.6%) but only one Control child (1.6%) whose ages were a year or more below the class average. No reply was given here for eight Highly-Able and three Control children.

A comparison of the heights of the sample children with the averages for their school classes showed the Gifted to be shorter than the Control Group - a fact partially explained by the larger number of Gifted children below the average class age. There was little difference between the reported weights for the two Groups

TABLE 7/22 **HIGHLY-ABLE AND CONTROL CHILDREN: Chronological Age, Height and Weight compared with Average for School Class.**

CHARACTERISTIC			HIGHLY-ABLE GROUP		CONTROL GROUP	
			No.	%	No.	%
AGE	YOUNGER	About 6 months	13	18	11	17
		1 year	5) 20	7) 28	1) 12	2) 19
		Over 1 year	2)	3)	0)	0)
	AVERAGE		41	56	38	59
	OLDER	About 6 months	9	12	9	14
	NO INFORMATION		3	4	5	8
HEIGHT	SHORTER		16	22	10	16
	AVERAGE		32	44	22	34
	TALLER		22	30	25	39
	NO INFORMATION		3	4	7	11
WEIGHT	LIGHTER		15	20	12	19
	AVERAGE		29	40	32	50
	HEAVIER		19	26	16	25
	NO INFORMATION		10	14	4	6
	TOTAL NO. OF CHILDREN		73	100%	64	100%

of children but no reply was given here for 14% of the Highly-Able and 6% of the Control children. Table 7/22 gives comparisons between the sample's physical development with that of their peers.

The teachers' replies showed similarity between the physical characteristics of the Highly-Able and Control Groups, the chief contrasts being that seven Highly-Able as against one Control child were a year or more below the average class age and the mean height of the Highly-Able children was less than that of the Control Group. Data regarding the children's actual heights and weights were not available as the majority of the schools involved did not keep records of these measurements. A proportion of the children were weighed and measured in the schools by the investigator but the data has not been included as they are incomplete.

TABLE 7/23 **STANDARDS OF HEALTH AND PHYSICAL DEVELOPMENT**

PHYSICAL DEVELOPMENT AND HEALTH	HIGHLY-ABLE GROUP		CONTROL GROUP	
	No.	%	No.	%
VERY GOOD	24	32.8	22	34.4
GOOD	23	45.2	27.5	43.0
AVERAGE	14	19.2	11.5	18.0
POOR	1	1.4	3	4.6
VERY POOR	1	1.4	0	0
NO INFORMATION	0	0	0	0
TOTAL	73	100.0	64	100.0

2) Physical Development, Health and School Attendance

The teachers reported the health of the sample children as 'good' or 'very good' and only two Highly-Able and three Control pupils were shown to have had 'poor' or 'very poor' health. The data are given in Table 7/23.

The school attendance levels were high for the majority of the sample. The ratio of 1:2 for the percentage of the Highly-Able as compared with that of the Control children shown as having had full attendance in noteworthy.

TABLE 7/24 SCHOOL ATTENDANCE

ABSENCE DURING PREVIOUS 12 MONTHS	NUMBER OF		PERCENTAGE	
	HIGHLY-ABLE GROUP	CONTROL GROUP	HIGHLY-ABLE GROUP	CONTROL GROUP
None	5	8	6.8	12.5
One week or less	42	32	57.5	50.0
One month or less	21	20	28.8	31.2
Up to one term	1	-	1.4	-
No information	4	4	5.5	6.3
TOTAL	73	64	100.0	100.0

3) Standard and Nature of Performance in School-work

The main emphasis in the teachers' questionnaire was on various aspects of the children's school-work. The responses have been examined under the following headings:-

i) Classroom organisation and the modes in which the pupils were taught,

ii) degree of attentiveness in class,

iii) average levels of the sample's achievements in class-work and variation in performances with subject matter,

iv) classroom activities at which the children performed 'best' and 'poorest',

v) standards of achievement at games and swimming.

i) Classroom organisation and the modes in which the pupils were taught: Distributions of the modes in which the children learnt in the classroom are shown in Table 7/25. The values obtained showed 40% of the Highly-Able and 64% of the Control pupils worked at a table with four or five others, the difference between the Groups being significant ($p < .01$). By contrast, a larger section of the Highly-Able, 53%, studied on his/her own compared with 30% of the Control Group, the variation in these proportions also being significant ($p < .05$). For both Groups the percentages of pupils working with the class as a single unit was small (Highly-Able 7%, Controls 5%).

TABLE 7/25 CLASSROOM MODE OF WORKING

CLASS ORGANISATION	NUMBER OF		PERCENTAGE		SIGNIFICANCE $p <$
	HIGHLY-ABLE GROUP	CONTROL GROUP	HIGHLY-ABLE GROUP	CONTROL GROUP	
Working as a single unit	5	3	7	5	-
4 or 5 children at a table	29.5	41	40	64	0.01
Working on own	38.5	19	53	30	0.05
No Information	-	1	-	1	-
TOTAL	73	64	100	100	

ii) Degree of Attentiveness in Class: Over half the Highly-Able children, a proportion twice that recorded for the Control Group, were reported as being 'very attentive' in class while larger percentages of the Control children were shown as being of 'average' attentiveness. For the small residue more of the Control than of the Highly-Able children were recorded as 'inattentive'. For three of the comparisons set out in Table 7/26 the differences between the Groups are significant at the p< .01 and p< .05 levels respectively.

TABLE 7/26 DEGREE OF ATTENTIVENESS IN CLASS

BEHAVIOUR	NUMBER OF		PERCENTAGE		SIGNIFICANCE (Chi-square) p<
	HIGHLY-ABLE GROUP	CONTROL GROUP	HIGHLY-ABLE GROUP	CONTROL GROUP	
Very Attentive	47.5	19	65	30	0.01
Average Attentiveness	23	37	31.5	58	0.01
Inattentive	1	8	1.25	12	0.05
Disciplinary Problem	0.5	-	1	-	-
No information	1	-	1.25	-	-
TOTAL	73	64	100.0	100.0	

iii) Average Levels of Achievement in Class-work and Variation in Performance with Subject Matter: Calculated values for the teachers' replies regarding the standards of work reached by the sample children in comparison with their peers are shown in Table 7/27. The considerable variation in the distributions of the performances of the two Groups is discussed in Chapter 8, (p. 352).

TABLE 7/27

SAMPLE'S STANDARDS OF WORK RELATIVE TO THAT OF THEIR SCHOOL CLASSES

GROUP	NO. IN GP.	NUMBER OF CHILDREN				PERCENTAGES			
		Below Average	Average	Above Average	One Year & Over	Below Average	Average	Above Average	One Year & Over
Highly-Able	73	2	4	45	22	2.7	5.5	61.6	30.1
Control	64	12	36	15	1	18.8	56.3	23.4	1.6
High IQ Sub-Group	31	2	1	17	11	6.5	3.2	54.8	35.5
Low IQ Sub-Group	41	12	25	4	-	29.2	61.0	9.8	-

The teachers' reports indicate similarity between the two Groups regarding variation in performances with subject matter; 80% of the Highly-Able and 77% of the Control Group's standards of work being judged on a level, while for 21% of the Highly-Able and 22% of the Control Group these were considered to be uneven. Answers were omitted for 2% of the Control children.

iv) Classroom Activities at which the Children Performed 'Best' and 'Poorest': The teachers were asked to select from a list of most of the usual classroom activities the subject areas in which each individual child performed best or poorest. The resultant distributions of the frequencies of the alternative curriculum areas named by the teachers from the list provided as being performed the 'best' and 'poorest' by the sample pupils are given in Tables 7/28 and 7/29. Attainment profiles depicting the percentage values for each of the selected subject areas, and the proportions of the Groups for which no information was supplied, are shown in Figures 7/1 (a) and 7/1 (b).

The profile for the Highly-Able Group indicates great variation between the percentage values for the different subject areas. 32% and 30% respectively of the Highly-Able children were reported to have 'Maths & Science' and 'Reading' as their 'best-performed' subject areas but for each of 'Social Studies', 'Painting', 'Pottery, Craft & Needlework', and 'Music & Movement' were quoted as the 'best-performed' subject area for only 1% or less of the Highly-Able pupils. 14%, 6% and 2% of the Highly-Able sample were stated to achieve 'best' in 'Creative Writing', 'Project' and 'Music & Singing' respectively.

FIGURE 7/1 (a)

PROFILE OF 'BEST' PERFORMED CLASSROOM SUBJECT AREAS

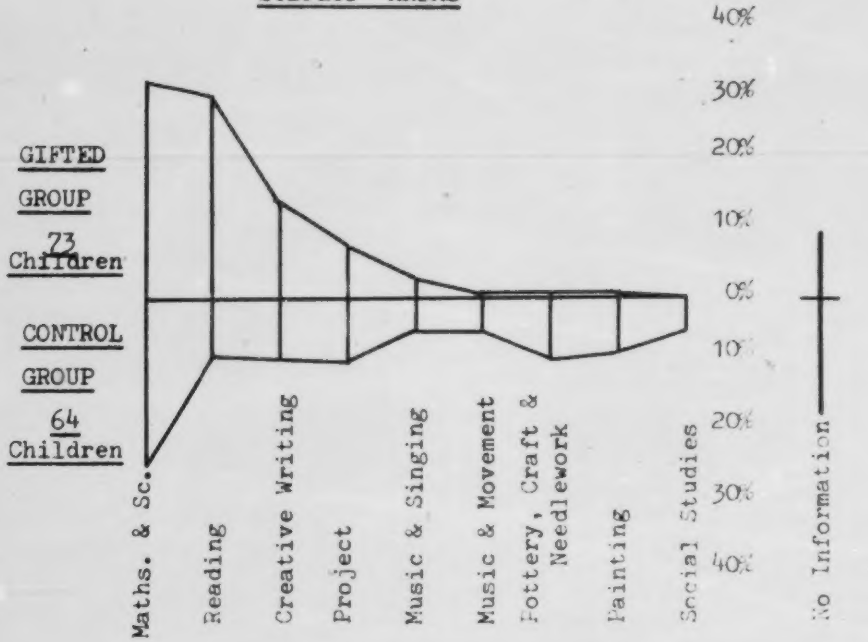


FIGURE 7/1 (b)

PROFILE OF 'POOREST' PERFORMED CLASSROOM SUBJECT AREAS

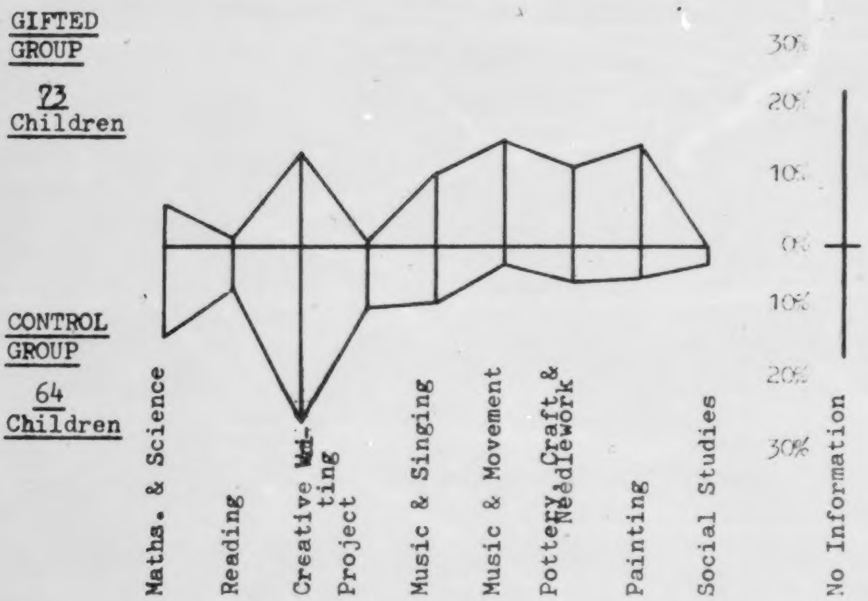


TABLE 7/28 TEACHERS' REPLIES - SUBJECT AT WHICH SAMPLE CHILDREN PERFORMED BEST

SUBJECT AREA	HIGHLY-ABLE GROUP		CONTROL GROUP		SIGNI-FICANCE (Chi-sq.) p<
	No.	%	No.	%	
Reading	22	30	5.5	8.5	0.01
Creative Writing	10	14	6	9	-
Maths. & Science	23.5	32	15.5	24	-
Three R's (i) (Reading, Cr. Writing, Maths & Science)	55.5	76	27	41.5	0.01
Three R's (ii) (Reading, Cr. Writing, Arithmetic)	53	73	27	41.5	0.01
*Project	6	8	6	9.5	-
*Social Studies	0	0	3	5	
*Painting	0.5	1	5	8	0.01
*Pottery, Craft & Needlework	1	1	6	9	
*Music & Movement	1	1	3	5	-
*Music & Singing	2	3	3	5	
No Information	7	10	11	17	-
TOTAL	73	100	64	100	

Note: Subject areas marked * combined on account of smallness of numbers.

There was far less variation between the percentages of the Control pupils said to perform 'best' in particular subject areas. For three of the nine values there was 5% or less difference in the number of the Control children stated by their teachers to have performed 'best' in each of the specific subject areas - while the values were 6% - 10% inclusive in five further instances. 'Maths. & Science' was the exception as 25% of the Control children were said, unexpectedly, to produce their best work in this area.

'Reading' was pronounced by the teachers as the 'best-performed' classroom subject area for a significantly larger proportion ($p < .01$) of the Highly-Able as compared with the Control pupils - conversely, when the craft subjects are combined a significantly smaller proportion of the Highly-Able Group is mentioned ($p < .01$). 'Project' was named as the 'best' performed subject area for similar percentages of both Groups; for each of 'Social Studies', 'Music & Movement' and 'Music & Singing the proportions of the sample Groups were small but in all three cases the number of the Highly-Able pupils said to be 'best' at one of these subject areas fell below that for the Control Group.

Considering the 'Three R's' combined (Table 7/29), the frequencies of their quotation represents 76% of the 'best-performed' subject areas for the Highly-Able Group but only 42% for the Control Group; the statistically significant difference between the two Groups here is at the $p < .01$ level.

The distributions formed by the two sets of values in respect of the numbers in each Group pronounced to have performed 'best' in the separate subject areas have been examined by use of the chi-square test and the difference between the Groups was found to be statistically significant at the p < .05 level. The subject areas represented by small values were combined as shown in Table 7/29.

TABLE 7/29 TEACHERS' REPLIES - SUBJECT AT WHICH SAMPLE CHILDREN PERFORM POOREST

SUBJECT AREA	HIGHLY-ABLE GROUP		CONTROL GROUP		SIGNI-FICANCE
	No.	%	No.	%	p <
Reading	0.5	1	4.5	7	-
Creative Writing	10.5	14	17	27	-
Arithmetic	4.5	6	9	14	-
Three R's (Reading Creative Writing, Arithmetic)	15.5	21	30.5	48	0.01
Project	1	1	6	9.5	-
Social Studies	0	0	2	3	-
Project & Social Studies	1	1	8	12.5	0.01
Painting	11	15	3	5	-
Pottery, Craft & Needlework	8.5	12	3.5	5.5	-
Painting and Pottery Craft & Needlework	19.5	27	6.5	10.5	0.05
Music & Movement	12	16	2	3	0.05
Music & Singing	8	11	6	9	-
Music & Movement & Music & Singing	20	27	8	12	0.05
No Information	17	23	11	17	-
TOTAL	73	99	64	100	

The distributions of the subject areas at which the sample children were said to perform 'poorest' by their teachers is shown in Table 7/29 and in Figure 7/1 (b). A smaller proportion of the Highly-

Able children, as compared with the Control Group, was found to have as their most 'poorly-performed' subject areas the following:-

Reading,
Creative Writing,
Arithmetic,
Project,
Social Studies,
Music & Movement.

For both sample Groups 'Creative Writing' was the subject area which obtained the largest frequencies as the most 'poorly-performed', it being named as such for 14% of the Highly-Able and for 27% of the Control Group - the largest percentage for any one subject area for either of the two Groups.

Relatively larger proportions of the Highly-Able compared with the Control Group were shown to perform 'most poorly' at 'Music & Movement', the difference between the Groups being statistically significant ($p < .05$). In addition, when the values for 'Painting' and 'Pottery, Craft & Needlework' are combined, the gaps between the proportions for the two Groups are increased and also become statistically significant ($p. < .05$). Conversely, relatively smaller proportions of the Highly-Able Group compared with the Control Group were shown to perform 'most-poorly' at the 'Three R's' combined and for the combination 'Project and Social Studies' - the difference in both cases being significant ($p < .01$).

In general, the two profiles for the 'poorest' subject areas, (Figure 1 (b) show less variation than do the two profiles for the 'best-performed' subject areas. For the Highly-Able Group differences between the frequencies with which particular subject areas are named as the 'poorest-performed' are less than in the case of the 'best-performed' sections of the curriculum where the teachers have shown a clear dominance by the 'Three R's'. The reverse situation is depicted for the Control Group where there is a large variation in the frequencies with which the separate subject areas are quoted by the teachers as being the most 'poorly-performed' - due in particular to 'Creative Writing' being named in this context for 27% of the Control pupils. Accordingly, the latter pattern is more uneven than that provided by the profile of the Control Group's 'best-performed' subject areas or of that for the Highly-Able Groups 'poorest-performed' subject areas.

There is a considerable degree of consistency between the two profiles of the 'best' and 'poorest' subject areas for each of the two Groups. For the Highly-Able pupils a large proportion were shown to perform 'best' in one of the 'Three R's' (Fig. 7/1 (a) while small percentages were shown to have attained poorly in this curriculum area, (Fig. 7/1 (b). Likewise, few of the Highly-Able were shown as performing 'best' at the craft subjects while the profile for their lowest levels of achievement showed relatively large frequencies. There was consistency too for the 'best' and 'poorest' subject area profiles of the Control Group.

The teachers were asked to specify for each particular pupil the child's 'best' and 'poorest' subject areas (see Appendix 'C', Teacher's Questionnaire, Q. 6 & 7). The validity of subjective ratings of this type is always questionnable and it may be that the teachers' responses were influenced by the general level of performance in the separate subject areas of their school class as a whole.

v) Standards of Achievement at 'Games & Swimming': The teachers were asked to indicate the level of the sample children's attainment in 'Games & Swimming', by implication, relative to that of their peers (see Appendix 'C', Teacher's Questionnaire, Q.8). The ratings showed only 19% of the Highly-Able children as 'very good' at 'Games & Swimming' compared with 30% of the Control Group, while the corresponding values for 'average' were 50% and 63% respectively. However, a greater percentage of the Highly-Able Group, 25%, were rated as 'poor' against only 7% for the Control pupils and there is a statistically significant difference between the two Groups (p< .01). The variation between the distribution of numbers in the separate ratings for the two Groups was also calculated to be at the same level of probability. The teachers' replies are tabulated in Table 7/30.

TABLE 7/30 TEACHERS' RATINGS OF SAMPLE CHILDREN'S RELATIVE ACHIEVEMENTS IN 'GAMES & SWIMMING'

STANDARD AT BOTH 'GAMES & SWIMMING'	NUMBER OF		PERCENTAGE		SIGNIFICANCE (Chi-sq.) p<
	HIGHLY-ABLE GROUP	CONTROL GROUP	HIGHLY-ABLE GROUP	CONTROL GROUP	
Very Good	14	19	19	30	-
Average	36.5	40.5	50	63	-
Poor	18.5	4.5	25	7	0.01
No Information	4	-	5.5	-	-
T O T A L	73	64	99.5	100.0	
Comparison of distributions:-					
Highly-Able Group:	14, 36.5, 18.5, 4				0.01
Control Group:	19, 40.5, 4.5, 0				

4) Social Relationships in School

The teachers' replies regarding the Highly-Able children's popularity within their school classes showed these pupils to have been less favoured than were the Control Group - relatively smaller percentages being 'very popular' or of 'average popularity' whereas the fraction described as 'not very popular' or as 'isolates' was greater than for the Control Group. When the latter two categories were combined the difference between the Highly-Able and Control Groups was significant ($p < .05$). The teachers' responses are set out in Table 7/32.

The pattern of the replies here is consistent. In answer to the degree of popularity of the Highly-Able children with their peer group, the responses for the first two positive ratings indicate that in each category the proportion of the Highly-Able pupils is less than for the Control Group; whereas in reply to the next two enquiries about the degree of unpopularity, the proportion of the Highly-Able is in both cases shown to be the greater. However, when the two distributions formed by the sets of four numbers for each Group are compared, the difference between them is not statistically significant.

As may be seen from Table 7/32, the majority of the Sample children were shown to be one of a group of friends in their respective school classes but the percentage was less for the Highly-Able Group. More limited sections of the sample children were said to have one special friend among their peers and here the Highly-Able proportion was larger. The percentages 6% and 3% of the two Groups shown to have no friends were small but, nevertheless, it is noteworthy that the proportion of Highly-Able children so rated is twice that of the Control pupils.

There was little difference between the two sample Groups in the proportions of the children said to be one of several friends or to have a special friend in higher or lower class - the chief variation being between the 45% of the Highly-Able and 34% of the Control pupils said to have no friends in such school classes. No answers were given for 18% of the Highly-Able and 23% of the Control Group and it may be that information regarding the children's friends in other school

TABLE 7/31 **TEACHERS' RATINGS OF SAMPLE CHILDREN'S POPULARITY**

POPULARITY GRADING	NUMBER OF		PERCENTAGE		SIGNIFICANCE (Chi-sq.) p<
	HIGHLY-ABLE GROUP	CONTROL GROUP	HIGHLY-ABLE GROUP	CONTROL GROUP	
Very Popular	17	17	23	27	-
Average popularity	44	45	60	70	-
Not very popular	10	2	14	3	-
An Isolate	2	-	3	-	-
T O T A L	73	64	100	100	
COMBINED VALUES 'Not very popular' & 'Isolate'	12	2	17	3	0.05
Comparison of Distributions:-					
Highly-Able Group:	17, 14, 10, 2				Not Significant
Control Group:	17, 45, 2, 0				

TABLE 7/32 **TEACHERS' REPLIES ON SAMPLE CHILDREN'S SCHOOL FRIENDS**

GROUP	FRIENDS						TOTAL			
	One of a Group		One Special		None		No.	%		
In Own Class:	No.	%	No.	%	No.	%				
Highly-Able	52	71	17	23	4	6	73	100		
Control	52	81	10	16	2	3	64	100		
Signif. p<	-		-		-					
In Higher or Lower Class									NO INFO.	
									No.	%
Highly-Able	18	25	9	12	33	45	73	100	13	18
Control	31	33	6	9	22	34	64	99	15	23
Signif. p<	-		-		-				-	

classes was not known to their class teachers. However, it may be noted that of the two sets of pupils the Highly-Able Groups is again the larger in the 'No friends' category.

5) Teachers' General Comments

The teachers made remarks for 34 of the Highly-Able and 25 of the Control children, that is for less than 50% of either Group. They referred to proportionately more boys as compared to girls in both Groups.

A wide range of matters connected with the children concerned were contained in the teachers' comments and these - as with the parents' remarks - underline the fact that intellectually gifted children vary considerably in their other characteristics. For purposes of examination the comments have been subsumed for each Group separately under five headings in Appendix 'B', Table 1. Classification of the material has necessitated comments relating to some individual children being divided so as to include the relevant parts in the appropriate section of the table.

(i) Physical handicaps: The Highly-Able pupils were shown as having rather more physical handicaps than did the Control Group. 'Spastic' and 'asthma' are conditions which might be expected to impinge considerably upon a child's life style.

(ii) Personality: Comments under 'General Personality Characteristics and Adjustment' related to seventeen children in each Group. The diverse features mentioned vary in the extent to which they normally received social approbation. The teachers seem to have suggested that six of the Highly-Able pupils were very likeable or helpful. Among the Control children seven appeared to have been happy and friendly and another five were considered to be pleasant although possibly quieter. The foregoing comments on the part of the teachers seemed to suggest positive approval for six of the Highly-Able compared with twelve of the Control children.

A neutral remark was appended to four of the Highly-Able; for a further child complexity was indicated in that the boy was said to have been both a bully and to have helped his classmates while he himself tended to be of a nervous disposition. For the remaining five Control children the comment about one was neutral but for the other four the implication was that there appeared to be an adjustment problem such as immaturity, moodiness, timidity, etc. The teachers' remarks were unfavourable for four of the Highly-Able children who were considered to be 'precocious', 'self-centred', 'withdrawn', and 'worried'.

(iii) Schoolwork: The teachers' comments on performance in school-work covered 31% of the Highly-Able Group as compared with 19% of the Control pupils.

Among the observations referring to twenty-six Highly-Able children, for eleven their school-work was said to be markedly superior to that of their peers, the terms 'excellent', 'exceptional' and 'enthusiastic' appearing in the comments and of these, two were said to be original thinkers and one to be particularly interested in problem-solving. The standards of work of six more of these pupils were reported as 'good' or 'very good' and the children were said to have a mature vocabulary, a broad general knowledge background, etc.

A further three were recorded as having an interest or ability in 'Music', 'Drama' and/or 'Sport' while a musical child, with poor health, worked in the classroom during playtime. One Highly-Able girl was said to have liked working with a 'high I.Q. friend'; an unexpected remark relating to another exceptional child was that she was 'average but worked hard in class'. The teacher of a Highly-Able boy seemed dissatisfied with him when she commented that he had to be interested "to put a lot into" his school-work - as did the teachers of the last two individuals among the set of twenty-six who were described as an 'under-achiever' and as 'lazy, making a minimum amount of effort', respectively.

No brilliance among the 25 Control children was indicated by the teachers but two of the pupils were considered creative, one in project work and the other in 'writing stories' - two others were thought to have been 'good all-rounders'. One Control boy was described as 'good at needlework'. For six other pupils the teachers' comments suggested some dissatisfaction, the children being said to have been 'inattentive', 'careless', 'making insufficient effort with their work', etc. and for one further Control pupil disapproval might be implied by the remark "He prefers football to academic work".

(iv) Popularity: The children's popularity with their school peer groups was mentioned by their teachers for only six of the Highly-Able and four of the Control Group. Of the Highly-Able pupils, one was described as 'sociable', two as having few friends, while the remaining three appear to have been without friends. By contrast, three out of four Control children were said to be well-liked and sociable, only one preferring his own company.

(v) Home Background: The teachers only commented upon the parental support for six of the Highly-Able and two of the Control pupils. The home backgrounds of two of the Highly-Able were thought to be 'good' and for one of the Control children it was said to be 'very good'. The parents of three more of the Highly-Able pupils were said to have a particular interest in their child's education but whether or not this was considered to be beneficial was not indicated - for the sixth Highly-Able child the home background was graded as deficient but the teacher commented that the child's intelligence was revealed nevertheless. As regards the second Control pupil, the school drew attention to the fact that there was a handicapped sister which resulted in pressure at home on the fit child.

TEACHERS' QUESTIONNAIRES

SUMMARY

Questionnaires were completed for 100% of the sample. The majority of the pupils were of approximately the same chronological age, height and weight as their school classroom peers but 10% of the Highly-Able and 2% of the Controls were a year or more younger and a smaller proportion of the Highly-Able than of the Controls were taller. The sample's health and school attendance rate was good.

The level of achievement of 90% of the Highly-Able and 24% of the Control Group was above the class average, 30% and 2% respectively were a year or more in advance. The two groups were similar as regards variation in performance with subject matter. The Highly-Able Group were more attentive than the Control Group. A larger proportion of the Highly-Able pupils worked on their own.

Most of the Highly-Able children were said to be 'best' at the 'Three R's' and 'poorest' at the craft subjects. Proportionately fewer of the Controls were 'best' at the 'Three R's' and more were so at the craft subjects. 24% of the Controls (Highly-Able 14%) were 'poorest' at 'Creative Writing'. A larger proportion of the Highly-Able compared to the Controls were 'poorest' at 'Painting', 'Pottery & Craft' and 'Music & Movement'. The Highly-Able achieved a lower level of attainment than the Controls in 'Games & Swimming'. For the 'best' and 'poorest' subject areas, the teachers were asked for a rating related to the spectrum of the individual child's performance - but for 'Games & Swimming' the rating was by implication with regard to peer group norms.

Most of the sample were popular in their school classes but the percentage unpopular was larger for the Highly-Able (17%) than for the Controls (3%). Most of the sample had friends in their own school classes but 6% of the Highly-Able and 3% of the Controls did not.

Teachers noted only a few physical disadvantages, more among the Highly-Able than the Control Group. The sample varied widely in personality characteristics. The Highly-Able showed great academic and some creative ability in their school-work - creative ability was noted in the Control Group too. Very few comments related to popularity with peers; three Highly-Able had no friends and one Control was sometimes solitary.

Chapter 8

DISCUSSION AND CONCLUSIONS

This study has examined 73 Highly-Able pupils to discover their standards of scholastic attainment and the nature of some of their other characteristics related to the school setting. The problems associated with the identification of pupils within the top 1% of intellectual ability has meant that a random sample of such children has not been obtained.

1) Identification of 'Intellectually Highly-Able' Children.

Unlike other categories of exceptional children, the identification of the intellectually highly-able child presents an intrinsic problem. Whereas physically handicapped and many of the mentally backward children are easily recognizable, the discovery of highly-able children presents special difficulties since their unusual qualities may not be reflected in their scholastic performance. Such pupils may be classified as those who:-

1) have abnormally high attainment records in scholastic work,
2) form disciplinary problems in school and/or are otherwise maladjusted,
3) may appear to be merely bright or even average, and whose scholastic performance does not indicate them to have exceptional intellectual talents. Children in this category will be called the 'covertly highly-able'.

The existence of exceptionally intellectually able children in each of these three categories has been recognised in various contexts

The first classification includes the high-achieving pupil who wins scholarships and essay competitions, etc. The second category covers children who, upon referral to Child Guidance Clinics, have been found to be exceptionally able. Pringle (1970) studied 103 such pupils who had become problems in school or who were in other ways maladjusted. She reports ('Able Misfits', p. 75) that between one-quarter to a half of her sample obtained scholastic attainment test scores which were one or two years below their actual age. The Plowden Report (1967, p. 306), too, draws attention to the existence of such children stating:-

> "One must not restrict the search for the highly-gifted to children who are doing well in school to the 'good'; one must look at the 'difficult' one as well."

Turning to the third category, the covertly highly-able children, it is for the very reason of their covertness that they are frequently unrecognised and hence information about them is scanty. Nevertheless, there is research evidence that such pupils exist and that some are not recognised by their teachers. An American study by Pegnato and Birch (1959), involving 1,400 Junior High School children, found that their teachers nominated only 45.1% of the children who subsequently obtained a Stanford Binet Intelligence Quotient of 136 or above. 92.3% of such children were identified on a Group IQ test with a cut-off of 115 and other methods used additionally were Achievement Tests and the School records. Similarly, the Ohio Study (Barbe, 1964) of 65 highly intellectual children (I.Q. base 148 on the Stanford Binet) reported that 25% of the group were not included by their teachers as being the most intelligent children. In this country, the Oxford study (1967) of 44 secondary 'High I.Q.' pupils identified the children with the aid of 11-plus selection data. The report quotes from the comments of the secondary schools involved:- "The pupils chosen have not so far shown themselves as able as several others in their year" and "These are not the most intelligent ones in their respective classes".

The present findings are in line with the foregoing. Twelve of the 73 Highly-Able pupils were nominated by their teachers as Control children of average ability to be paired with the Highly-Able pupils in the same school classes. As the teachers nominated only 37 of the present Group (the remainder being named by their parents or educational psychologists) the twelve unrecognised as highly-able represent almost a third. The apparent failure of the teachers to recognise a proportion of intellectually exceptional children found in this study supports similar findings by Terman, Pegnato & Birch, and Barbe in the United States.

Over-estimation on the part of the schools of the ability of some average-bright children has been found here and this, too, is in agreement with American work. Pegnato and Birch (1959) state that almost a third (31.4%) of the children chosen by their teachers as 'gifted' obtained an I.Q. score of less than 136 on the Stanford Binet test. In this country Tempest (1971) reports that of 72 seven-year olds nominated by their teachers as 'gifted', 39 scored below 127 on the W.I.S.C. when tested individually, and of these seven scored below 110. In the present study, 16 pupils failed to score an I.Q. of 140 on the Stanford Binet from among the 53 nominated as highly-able by their teachers, representing 30.1%. The percentages found in the American and the present British study are unexpectedly close.

In recent years the existence of covert highly intellectual children although not so named, has been acknowledged by teachers and others. Ogilvie (1973, p. 42) comments that about half of the teachers agreed that many 'gifted' children are probably unidentified in the schools. A few lines further on he continues:-

> "in the professional opinion of most teachers there is a risk that intellectual giftedness will remain unrecognised unless great care is taken".

Similarly Proctor (1966) states when discussing very able children,

> "Their needs are as important as those of backward children but may be overlooked because they are less obvious".

Lord Belstead, then Parliamentary Under-Secretary of State at the Department of Educational & Science, has been reported by the 'New Scientist' (28.12.72) as admitting that:-

> "There is no doubt that some gifted children are missed in the schools at both the primary and the secondary levels".

Where there is failure to recognise an intellectually 'gifted' child, it follows that there will also be a lack of appreciation of the high achievement levels which such a child might attain in the cognitive domain and teacher expectations in this respect will be pitched too low.

2) The Highly-Able Sample in the Present and Other Studies

The present study had as its aim the discovery of 50 pupils from Local Authority schools able to score over 140 on the Stanford Binet Intelligence Scale in order to study certain of their features; in the event 73 were found.

An exhaustive search for these children in the top 2% of the intelligence continuum in the participating schools was not undertaken.

The teachers nominated half the sample and it seems likely that the majority of their nominees were in the first category of highly-able children listed above, since the most usual criterion upon which teachers grade their pupils is performance in school-work. The minority of maladjusted children, who fall into the second category, have usually attended a Child Guidance Clinic where close examination has revealed their potential ability. It may be deduced that it will be the third group, the covert highly-able children, who are unnamed by their teachers as their scholastic standards are not greatly above the class average. It follows that the majority of the covert highly-able children are likely to be under-achieving with their school-work, relative to their measured potential, so that their inclusion in a group of highly-able children under study would reduce the mean level of attainment. A corollary is that whatever degree of under-achievement is found to be present among a group of highly-able children will understate the true position unless all the covertly highly-able children have been included.

The present study has found that the twelve covert highly-able children identified appear to have been under-achieving in their regular classroom performances since, notwithstanding a mean IQ of 150, their teachers rated the classroom standard of work as follows:-

(i) 10 pupils are only up to one year above the class average
and 2 pupils about the class average.

The 37 pupils identified by their teachers were judged to be:-

(ii) 10 - one year or over above the class avegage,
26 - up to one year above the class average, and
1 - about the class average.

The remaining 24, nominated by parents and psychologists (iii), took an intermediate position. It follows that the inclusion of the twelve coverts (i) brings down the mean level of the

> classroom attainment rating of the remaining 61 pupils (ii) and (iii) in the sample.

If more covert intellectually gifted children were present in the school population from which the sample children were drawn, (which is highly probably since no overall screening was undertaken), it may be assumed that the inclusion of such additional pupils would bring down the classroom rating. That is, the results found in this study may be expected to understate the degree of under-achievement existing among the population of 8,000 pupils due to bias in the sample on account of the selection of a disproportionate number of high-achieving pupils.

Attempts have rarely been made to identify all the highly intellectual children on a given criterion except as part of a general survey of all children in a particular geographical area such as those made by Burt in 1917, Wiseman (1951 & 1957), Pidgeon (NFER, 1955), Wright (1963) and Yule et al (1973). However, apart from Burt's follow-up of 'super-normal' children identified in his London Surveys (Tr. of Ed. 1962, p. 24-25), no specific study concerning the highly intellectual children appears to have been made.

Two American studies regarding 'gifted' children (Pegnato & Birch, 1959; Barbe, 1964) seem likely to have discovered a very high proportion of the pupils of superior intelligence in the school populations reviewed, the one as a result of the comprehensive test procedures adopted and the other through the efforts of 35 School Psychology Interns.

Few other studies report having undertaken such a systematic search for intellectual talent, most having relied initially on teacher nomination and subsequent intelligence testing. As has already been seen this procedure is likely to have resulted in covert highly intellectual children being unrecognised. This occurred even in Terman's classic study of 'gifted' children the purpose of which was not to identify all the children in the relevant school population having an I.Q. of 140 or over, but to make the study "as representative as possible of all gifted children in the territory covered". Accidental discoveries of additional pupils having an I.Q. of 140 or over led to a scrutiny of all children in seven schools leading to the discovery of three children, representing 25% of the nominations there, who would have been missed by the other methods of search. Terman went so far as to state:-

> "... if one would identify the brightest child in a class of 30 - 50 pupils it is better to consult the birth records in the class register than to ask the teacher's opinion".
>
> (ibid. p. 33).

He continues that this finding has high reliability as it is based on the nominations made by approximately 6,000 teachers. It does, of course, refer only to the situation in the Californian schools in the 1920's.

Again, the study of the 1958 Cohort made by Hitchfield (1973) cannot be said to have included all the surviving children of high intellectual ability since her sample of 238 children were drawn from 500 names resulting from the outcome of a 'Draw-a-Man' Test at aged seven and subsequent teacher and/or parent nominations at aged eleven. Thus, it is unlikely that the teachers would recognise the covert highly-able children as has been shown above while the comprehensiveness of parental nominations is questionable. The criteria for the selection of her sample were not limited to high intellectual ability but included physical skills and adjustment for social class composition. It appears that only 114 children (48% of 238) scored IQ's over two standard deviations from the mean (see my p. 96) indicating their exceptional intellectual capacity, which value represents less than half those who might have been expected to occur in a normal distribution consisting of 92% of the cohort of 17,000 re-located at the age of seven. Although this percentage would have been reduced further by the time the children were aged eleven, it seems that a proportion of the highly intellectual children in the cohort, for whatever reason, were not included in Hitchfield's study. It seems likely too that the findings on the levels of scholastic achievement of her highly-intellectual sample exaggerates the extent to which exceptionally intelligent children as a category are fulfilling themselves for reasons similar to those given above for the present study.

Other British studies of 'gifted' children by Lovell & Shields (1966) and Tempest (1974) did not have the objective of locating as many intellectually talented pupils as possible in a given school population.

No recent British attempt to obtain as nearly as possible a random sample of all the highly-able pupils in a given school population in order to study their characteristics is known. The majority of studies including the present one, have sought merely to discover a sample of highly-able children, relying in some degree upon teacher nomination and in so doing have obtained a biased sample since the covert highly-able children have been under-represented. American studies, referred to above, and the mis-nomination of the twelve ex-control children in the current work suggest that at least 25% of highly intellectual children are probably in the covert category. Considerations of the results of the present study given below must be made against the background of this bias inherent in the sample.

3) Importance of Scholastic Attainment

Primary school curriculums are concerned with the cognitive, affective, social and physical development of their pupils. While the present study has given some consideration to performance on the curriculum as a whole, it has been concerned particularly with examining the extent to which cognitive development as measured by the Stanford Binet IQ test is expressed in scholastic attainments.

The psychological theories discussed in Chapter 2 agree that there are differences between individuals regarding their mental characteristics - that among the latter is cognitive ability and that this too varies for one reason or another from person to person. Intelligence tests have been constructed of graded difficulty which are able to measure a sample of an individual's intellectual performance. In the case of the Stanford Binet Scale the content is ordered so that test items are of increasing difficulty and the individual providing the greater number of correct answers is deemed to have the greater intellectual powers. It is probable that most testees do not score the maximum of which they are capable in a test situation through nervousness, lack of motivation, etc., so that the IQ score obtained understates their true ability - but the converse does not follow. In a well-designed test of reasoning ability such as the Stanford Binet scale, an individual who scores an IQ of 140 or over must possess exceptional intellectual ability - unless as in rare cases there has been mis-use of the test - compared to other individuals with the same cultural background.

Intelligence tests originated as a means of identifying the less-able children in the school population and their content continues to draw partially upon language skills and other facilities acquired in school. Accordingly, it is to be expected that the child who scores highly on intelligence tests will also tend to attain highly on scholastic attainment tests, and so the contribution of scholastic learning to a high IQ score may diminish the difference in the gaps found between IQ and attainment in English and mathematics among the sample children in the present study. That is, if an IQ test were generally available which excluded the effects of point three of Merrifield's Model, 'Complex concepts resulting from school environment' (see Ch.2 p.34) it seems likely that the size of the gap between measured potential and attainment would be greater. An increased disparity between potential and performance might also be anticipated were a test based on Guilford's model of intelligence practical (see Ch.2 p. 31) such that the contribution to the final IQ score of cognition, manipulation and content might be disentangled.

The finding in this study has been that gauged against an absolute standard of scholastic attainment for their age-group and discounting differences in measured intelligence between the Highly-Able and Control Groups, the mean levels of performance in English language and mathematics by the Highly-Able pupils was superior to that of the Control children. This leads to consideration of whether performance at a normative level for their age-group in English language and mathematics is to be regarded as satisfactory for intellectually Highly-Able children. Incorporated in the above question are others, such as:-

a) Do exceptionally intelligent children, having gained a working facility in English and mathematics, use their surplus cognitive powers beneficially (i) for themselves and (ii) for society?

b) Does a normative facility in English and mathematics allow the efficient use of superior cognitive powers in other areas of scholastic endeavour?

The importance attached to education by our modern industrial society may be judged by the large allocation of resources it directs to this end. The consensus of opinion regarding the curriculum is shown by the similarity found in it between primary schools; skills in the 'Three R's', knowledge of the cultural heritage and of techniques fundamental to an industrial society being included within it almost without exception.

The state is desirous that its scarce resources are utilised as efficiently as possible - hence it is concerned with output relative to input - that is, cost efficiency. The 'time' of human-beings is a resource, being a necessary factor of production. If the time of either staff or pupils is mis-used, this represents the waste of a scarce resource. Psychological tests have been devised which give a measure, however imprecise, of the spread and complexity of cognitive operations of which an individual is capable. When a group of pupils whose intellectual ability has been established by the use of an individually administered well-recognised intelligence test, fails to display a corresponding performance in work output, there is reason to enquire the causes of the discrepancy.

Turning to the children's own interests, these may be viewed in the short- and long-term - that is, in the former situation their wish to engage in those activities holding immediate fascination for them - in the latter case, to spend time in their childhood in acquiring knowledge so that their life experience in adulthood may be broadened and enriched.

In the present study data regarding the use made of the time of a sample of intellectually highly-able children has been obtained from:-

(a) NFER attainment tests in reading, English and mathematics,

(b) teachers' ratings of the subject areas representing the children's 'best' and 'poorest' performances,

(c) teachers' ratings of the standard of work produced by the intellectually superior children in comparison with the class average,

(d) parents' reports of their off-springs' home occupations, and

(e) the children's own stated occupational preferences at school and at home.

The information obtained in the above contexts will be discussed in the following sections.

4) Relationship of Mental to Educational Age

In the present study, when examining the relative levels of scholastic performances by the Highly-Able and Control children, the data provided by the test scores set out in Chapter 5 lend themselves most readily to statistical analysis. The calculated values for mental and educational ages have indicated, for most of the calculations made, a larger discrepancy between the two types of mental measurement for the Highly-Able Group as compared with the Control pupils. The validity of these findings must, however, be judged against the quality of the statistics upon which the outcomes are based and in this context the following points are relevant:-

a) the standard errors of the tests used,

b) the statistical phenomenon of regression to the mean of a distribution where two tests are involved,

c) bias in the sample,

d) sample size.

(i) Coefficients of Reliability: The series of NFER English tests used, and the reading test, have high internal consistencies, the coefficients of correlation ranging from 0.96 to 0.97, while the standard errors range from 2.70 to 2.98; Basic Mathematics "C" has a standard error of 3.34 but similar statistics are unavailable for the other mathematics tests utilised since the latter have been constructed more recently. However, considerable extrapolation of the NFER tables of standardised scores was necessary so that greater statistical errors are likely to have resulted than those quoted from these procedures. In addition, although the Stanford-Binet intelligence scale has high reliability, and while the corresponding statistics (given above) for the NFER attainment tests are at an acceptable level, the probable error present in values calculated from two such distributions will be increased above that present in the original statistics.

The eight values calculated for 'r' between the mental and educational ages obtained during the present study range from only 0.82 - 0.92. For English they are 0.82 and 0.86 for the Highly-Able Main and Sub-Groups respectively and these are lower, as might be expected, than the corresponding values of 0.91 and 0.92 for the Control Group. A surprising outcome is found for mathematics where the pattern is reversed. For the Highly-Able Main Group 'r' is 0.908, whilst it is marginally higher still at 0.913 for the 31 children of the High IQ Sub-Group who gained IQ scores ranging from 160 - 213. There is a decrease in 'r' to 0.854 for the Control Main Group and to 0.821 for the Low IQ Sub-Group where the IQ scores range from 80 - 120. Figures A/3 and A/4 in Appendix 'A' show the regression lines separately for each of English and mathematics.

It may be that since the statistics are imperfect for the reasons already given, the 'r' values recorded above merely result from errors of measurement. If the values do have validity they appear to be indicating that the correlation between mental age and mathematical attainment is higher for the Highly-Able than for the Control children. This phenomenon may be the result partly of overlap between the tests used (see p. 261); the mathematical attainment tests are largely concerned with testing the degree to which the basic mathematical concepts have been grasped, whereas the intelligence test seeks, among other things, to measure the ability to recognise the relationships between similarities and differences. If such facility is possessed by an individual to a high degree, it might be expected that such mental attributes would also be applied to the manipulation of mathematical concepts and the high correlation between the two sets of obtained values may be due to the two tests measuring similar properties.

Should the latter conclusion be correct, it gives rise to a further question: to what degree is the high attainment in mathematics the product of the exceptional intellectual capacity of the children concerned and their ability to learn from their environment, and to what extent is it the product of the conscious teaching and stimulation given by the schools?

(ii) Regression to the Mean: The phenomenon of regression towards the mean of a second distribution of scores by those individuals who have gained scores in the tails of a first distribution is germane to the present thesis. In this work a study has been made of the relationship of IQ scores more than two-and-half standard deviations from the mean of the Stanford Binet Scale obtained by the Highly-Able pupils with the scores they obtained on attainment tests. Then, too, the size of the gaps found between the mean performances of the Highly-Able and Control Group children on the two tests have been compared. Since the latter Group have scored nearer to the Stanford Binet IQ mean, the gap between their mean scores on the intelligence test and that on the attainment test due to this phenomenon of regression would tend to be less. Consequently to the extent that such regression effects vary between the two Groups of pupils the differences in the sizes of the gaps between mental age and educational performance by the Highly-Able as compared with the Control children may be spurious.

Pidgeon (1961) has shown the 'effect of regression' when two different measures of mental attributes are used (pp. 36 - 39). The power of the regression effect is influenced both by the degree of correlation between the measures involved and by the extent of the divergence of the first score from the mean of the distribution in question.

The relevance of the degree of correlation between the two tests will be considered first. If the same test is given twice, since the actual tests are by definition identical, the correlation between them theoretically is unity and the regression effect nil. However, in the event the simple repetition of the same test would not result in an identical set of scores due to the effect of other factors, one of which would be practice. On the other hand, if the correlation between two measures is likely to be very low, as perhaps between the size of shoe taken and ability in learning a foreign language found among a set of individuals, the regression effect would asymtope towards its maximum. Pidgeon states (op.cit.) that 'the regression effect increases as the correlation decreases.' However, as has already been shown, it is erroneous to assume that a regression effect is necessarily the dominant influence.

In the present study a positive correlation exists between the two types of test used but regression effects will still occur - although it appears that their influences are largely nullified. The sample of Highly-Able children was selected partly by their teachers and partly by parents and psychologists. Of the 73 pupils in this Group, 37, that is, 50.6%, were nominated by their teachers, and since psychological tests are not normally given by the staff in schools, the majority of the judgments made are likely to have been based upon a high level of attainment in scholastic work by the pupils, although a few of the children may have been chosen without any such criteria and merely because of apparently highly intelligent behaviour in the classroom. However, for those teacher-selections which were based on scholastic attainment the phenomenon discussed above might be expected to show the IQ score relatively lower than the attainment score. Such a view appears to have Pidgeon's support since he states, "if children at the upper end of the distribution for reading had been given an 'intelligence' test, a large number of 'over-achievers' would have been found." (p. 39). Consequently, it may be concluded that, to the extent that similar proportions of the sample were selected on the high IQ score and on scholastic attainment, the resultant two sets of regression effects will be compensatory and the influence of this phenomenon will be negated. This finding is supported by the obtained values for the performances of the three Highly-Able sub-groups distinguished according to the mode of the pupils' original nomination. No discernible pattern was found in the differences between mental age and attainment score according to whether the children were nominated by their teachers on the one hand, or by parents and psychologists on the other. It must be added, however, that the numbers in the sub-groups were necessarily small.

(iii) Bias in the Sample: The above discussion has led to a consideration of bias in the composition of the sample. While the Highly-Able and Control Groups are comparable as regards the presence of such shortcomings, the pupils do not represent a random sample of highly-intellectual or average-bright primary school children. No blanket screening was undertaken in the course of obtaining the sample - nor were the schools themselves randomly selected - the main criteria for their inclusion being either geographical convenience or the present investigator's direct or indirect contact with the Head Teacher.

It seems reasonable to suggest that the participating schools, which rendered great assistance in the conduct of the present project, were not typical of schools in general in the measures they took to provide for the stimulation of highly-intellectual children. It seems likely, too, that the selection of the sample pupils by nomination may have resulted in an under-representation of the covert gifted children. It may be, therefore, that a bias exists in the sample of children studied here both as regards the schools from which the pupils were drawn and in the selection of the particular pupils chosen from within those schools, that a more optimistic view of the circumstances of highly intellectual children in primary schools has been presented than would have been found had both schools and pupils been randomly selected.

However, the objective of the present work has been to carry out a pilot study to facilitate the design of an improved project subsequently based upon a random selection of both schools and pupils from them so that the greater reliability of the obtained data may be suitable for more sophisticated statistical examination. It is hoped that the present study has been successful to this end.

(iv) Sample Size: Although the sample consisted of 73 Highly-Able and 64 Control pupils in the two Main Groups, while the High and Low IQ Sub-Groups contained 31 and 41 respectively, the low numbers of children who worked single test units such as English B.2 were insufficient for an adequate interpretation of the scores obtained to be made; this limitation was even more marked when the single test units were considered for the High and Low IQ Sub-Groups and the sub-groups of the Highly-Able pupils according to nomination. However, a large scale study would be able to rectify this position by increasing the sample size sufficiently for the sub-groups to include numbers sufficient to make them viable for statistical purposes.

5) Achievement Quotients

The mean Achievement Quotients have been calculated from the Stanford-Binet IQ (deviation scores) and the NFER Standardised scores. The values obtained for reading, English language and mathematics range from 74.4 to 92.9 and are given in Table 8/1.

TABLE 8/1
STANDARDISED
SCORES

QUOTIENTS FROM NFER STANDARDISED ATTAINMENT SCORES
DIVIDED BY IQs x 100
FOR HIGHLY-ABLE AND CONTROL GROUPS

HIGHLY-ABLE GROUP							CONTROL GROUP					
Test	No.	Mean IQ	s.d.	Mean SS	s.d.	Mean Dividend x 100	No.	Mean IQ	s.d.	Mean SS	s.d.	Mean Dividend x 100
READING	17	154	10.2	121	13.9	78.6	16	118	9.5	97	13.1	82.2
ENGLISH												
A.2	34	157	10.9	121	14.1	77.1	32	118	8.5	100	10.2	84.8
B.2	17	160	11.1	127	11.8	79.4	11	115	9.0	100	3.9	87.0
C.2	13	161	12.3	128	8.5	79.5	8	112	14.1	104	3.2	92.9
D.2	19	155	11.0	125	9.9	80.7	13	114	13.0	101	8.3	88.6
		Mean 158.3		**Mean** 125.3		**Mean** 79.2		**Mean** 114.8		**Mean** 101.3		**Mean** 88.3
MATHS												
'A'	32	158	10.9	121	11.7	77.1	30	118	8.6	95	14.4	80.5
'B'	12	160	10.6	124	12.4	77.5	10	120	6.3	104	7.0	86.7
'C'	21	160	11.2	119	8.0	74.4	17	114	11.7	95	10.0	83.3
'DE'	25	157	11.3	124	10.2	79.0	14	114	12.5	101	13.3	88.6
		Mean 158.8		**Mean** 122.0		**Mean** 77.0		**Mean** 116.5		**Mean** 98.8		**Mean** 84.8

Since NFER utilises standardised scores with a mean of 100 and a standard deviation of 15 (Tests for Guidance & Assessment, NFER, 1972, p. 4) and the revised Stanford Binet Intelligence Scale presents the IQ tables as standard scores (Handbook, p. 46) while it too has a mean of 100 and a similar standard deviation, it might have been expected that the mean of the Achievement Quotients derived from the two measurements would have approximated 100 for both sample groups. Alternatively this relationship may be given as by Pidgeon (1961, p. 35) "if for each child the difference between his standardised score on the 'intelligence' and attainment test was considered, the averages of these differences for all children would be zero."

However, although it is stated that (NFER, 1972, p. 4) "Most NFER tests have been standardised by testing large samples of children over the entire ability range", the school population involved may have had an IQ mean different from the IQ mean of the sample upon which the Stanford Binet test was standardised; in fact, the mean IQ of children in Southern England on this Scale has been shown to be between 104 and 105 (Wright, 1966). Under such circumstances the expected mean IQ would be higher than that anticipated for the attainment test scores (Pidgeon, op.cit. p. 39) so that it would be indicating not lower scholastic performance on the part of the sample children here, but differences in the original standardisation sample from that currently under study. The foregoing may assist in accounting for the shortfall of the obtained Achievement Quotients.

As regards the Control pupils, these were selected by their teachers as being average individuals in their school classes. However, when tested on the Stanford Binet Scale, they obtained an IQ mean of 116. The regression effect here is negative since the second test, being the IQ test, showed a higher mean score than the corresponding value for achievement. Nevertheless, it is probable that some of the differences between the theoretical and obtained Achievement Quotients may be attributed to statistical causes.

The gaps between the theoretical and observed Achievement Quotients are 20.8 (100 less 79.2) and 23.0 points for the Highly-Able Group and 11.7 and 15.2 for the Control Group for English and mathematics respectively, so it appears that there may have been relative under-achievement by the Highly-Able pupils as compared with those in the Control Group. As regards the occurrence of a gap between the theoretical and obtained values for both sample Groups, it may be that a part of the difference, at least, is a reflection of a lowering of standards of attainment in English language and mathematics of the general school population as compared with that applying at the dates when the NFER samples were drawn.

6) N.F.E.R. Attainment Test Performances Compared

The attainment test performances of the two sample Groups, relative to their measured ability, have been compared for reading, English and mathematics separately.

(1) Reading: Three out of four of the comparisons made for the younger infants show the Highly-Able children to have had a higher reading age, even relative to their measured potential, than the Control infants. The gap is not large but the regression effect might have been expected to bring the Highly-Able infants' reading age below that of their mental age. It seems likely that a proportion of the children had learnt to read before entering school and this view

receives support from comments made by parents. Another possible explanation of the anomaly is that in spite of the high IQ scores gained (160 - 213) these under-stated the infants' true potential. It might be, too, that although the children were paired for socio-economic background that the number of Highly-Able infants drawn from families in the higher occupational categories was proportionately greater than for the Control Group (see Figure 5/8) and that these differences in family background led to the infants' advanced performances.

(ii) English Language: A reversal is seen in the relative achievement positions of the Highly-Able and Control children when the results of twenty comparisons of sets of scores for English language are examined in which the corresponding level of attainment of the Highly-Able Groups is found to be below that of the Control pupils, the gaps being sufficient to be of statistical significance in fourteen cases. The finding here is that in comparison with the Control Group there appears to be under-achievement in English language by the Highly-Able Group relative to their measured ability.

If the explanations put forward above for the advanced reading ages of the Highly-Able children are accepted then the same considerations of under-estimation of potential and preferential family background should be taken into consideration here too, in which case the reversal in the trend of levels of relative attainment may be greater than depicted by the calculated values. A suggested reason for the apparent relative decline in performance is that teacher expectations for the Highly-Able children have not been high enough during the greater part of the time spent in the primary school so that there has been a gradual widening of the gap between the level indicated by their mental age and that shown by their attainment test scores. The results found here are in line with conclusions on the 'Brentwood Experiment' (Bridges, 1969, p. 24):-

> "Our finding has been that under-achievement can occur where a bright child has powers much in excess of what he is called on to use in school; such a child may be first in his class and still, from the viewpoint of his intellectual gifts, be under-achieving."

A proportion of the fourth-year Highly-Able juniors were facing entrance and scholarship examinations into Direct-Grant or Public schools which may account for the partial recovery in the comparative attainment level among this set of Highly-Able pupils.

(iii) Mathematics: Fourteen of the twenty comparisons made between sets of mathematics scores showed the Highly-Able children to have a lower relative level of achievement, the difference in six cases being sufficient to be of statistical significance. In particular the younger infants displayed a markedly lower level of relative achievement in mathematics that did the Control children, the gap being largest between the High and Low IQ Sub-Groups. It is possible that the explanation of this finding is that the highly intellectual children encompassing a greater degree of mental development found the experience of entering school more traumatic than their 'nearer-to-the-average' peers and that resultant learning difficulties impeded their early progress. The contrast between the Highly-Able infants' performances in mathematics with that previously noted in reading might be the result of a pre-school environment in which reading skills are often acquired but where learning of mathematical concepts occurs more rarely.

The position is reversed for the third and fourth-year juniors where the mean Attainment Quotient and Indices are relatively higher for the Highly-Able children. In the case of Basic Maths 'C' designed for third-year juniors, the Highly-Able Group obtained Achievement Quotients and Indices relatively higher than did the Control Group.

Since the performance level of the Control Group has been adopted here as a base line for consideration as to whether or not under-achievement is occurring among the Highly-Able Group, the results show it to be absent. However, the validity of the criterion adopted is questionable in this case since the performance level of the Control children on Basic Mathematics 'C' is 2y. 9m. and 1y. 2m. below their mental and chronological ages for the Main and Low IQ Sub-Group respectively. Turning to the attainment levels of the fourth-year juniors on Mathematics 'DE', the narrowness of the gap between the relative performances of the Highly-Able and Control Groups by comparison with the separation found between the two Groups of infants might be partially accounted for by increased motivation as a number of the pupils were preparing for entrance examinations into selective schools and/or sampling variation. Alternatively, the 'catching-up' of the Highly-Able found among the fourth-year juniors may be partially the result of the greater individualization of learning in modern primary schools.

Ficticious mathematical ages of 16y., 17y, etc. gained by some Highly-Able juniors may have shown 'over-learning' 1) since the curriculum content from which the values have been derived was not that

1) The term is used in the manner some Swedish educationalists have used it. Although the NFER tests have given a high attainment age, since this is not based on curriculum material normal to the higher age, it cannot be said to truly represent attainment at such a level but may be taken to indicate that such children would be able to do work at a higher level if it were offered.

of secondary school level. When a more advanced test including material from secondary schools' mathematics curriculum was presented to a few of the fourth-year juniors they were able to score only a few points as they had not learnt the academic syllabus covered. Since it is unusual for mathematics at an intermediate level to be introduced into junior schools it seems unlikely that the high levels of performance on the NFER tests were reflecting more advanced learning although the scores may have signified greater thoroughness in mastering the basic material which was covered. Some of the third and fourth year Highly-Able and Control juniors obtained mathematics tests scores in line with their mental ages but a concealed form of 'under-achievement' may nevertheless have been present among the Highly-Able pupils, since their mathematical ages were much higher than those of the Control children and as their scores were not based upon secondary school curriculums but only upon extrapolated scores on the NFER attainment tests.

7) Highly-Able Pupils:- Comparison of Teacher, Parent and Ex-Control Teacher-Nominated Children

It was expected that the teacher- and parent-nominated Highly-Able children would obtain higher mean attainment values than the Ex-Control pupils but no pattern of differences in the mean Achievement Quotients and Indices obtained by the three sub-groups formed according to the source of the pupils' nomination emerged. It has been seen (p. 315) that among the teachers' nominees were children with high levels of classroom attainment and it was assumed that parents who brought forward their off-spring as 'gifted' might be especially interested in education and likely to provide extra encouragement and/or assistance with their children's school-work.

There were lower attainment values for the Ex-Control children obtained generally for reading and English language but not mathematics compared with the remainder of the Highly-Able Group. It might be that the twelve covert Highly-Able pupils on the occasion of participating in a research study were motivated to complete the attainment tests as well as they were able, so achieving at a higher level than in their normal classroom work. Only two of them obtained standardised scores below 100 (93 and 98) while two others gained raw scores within three points of the ceiling of the appropriate mathematics test and were given the next more advanced test in the series. Yet ten of the twelve Ex-Control pupils were shown on the Teachers' Questionnaires as having a classroom standard of work which was average for the school class.

8) Relative Levels of Scholastic Achievement

The discussion here is concerned with the various standards of scholastic achievement gained by the Highly-Able children.

(1) 'Classroom Under-Achievement'. This term has been adopted to cover the situation where the regular standard of work performed in the classroom by pupils is graded by their teacher as being a year or more below that which the same children have otherwise shown themselves capable of producing.

The mean standardised score for the combined English and mathematics test series for the covert Highly-Able Sub-Group was 116 and on the tests used about eight points of standardised score represented an age allowance of one chronological year. The mean standardised score for the Control Group was approximately 100 and this may be taken as a rough measure of the average performance levels of the sample pupils' school classes as the teachers were originally asked to select average children as Controls. It may be seen that even allowing for statistical errors of measurement among the covert Highly-Able Sub-Group there was probably 'classroom under-achievement' upon the criterion stated above.

(ii) 'Over-Achievers': This term refers to those pupils whose calculated mathematical or English educational ages exceeded that of their measured mental age on the Stanford Binet test.

English or mathematical ages which were above their Stanford Binet mental ages were obtained by 12.4% of the Highly-Able sample (five and four pupils respectively). This result was unexpected since although Pidgeon states (1961, p. 36) that if two mental tests both have standardised scores with the same standard deviation and a mean of 100, then an equal number of 'over-' and 'under-achievers' may be anticipated, he was discussing whole distributions including the scores gained on both tests below the means. However, in the present study the nine children involved had a mean IQ score of 156, over three standard deviations from the mean while their attainment test scores showed even greater deviations from the test means. Less surprising was the 'over-achievement' of six Control children with a mean IQ of 117.

Examples of the fictitious educational ages obtained for the Highly-Able pupils are:-

	CA	MA	Eng. EA
Child 'A'	6y 10m	9y 9m	10y 3m
Child 'B'	11y 0m	19y 11m	21y 6m
			Maths. EA
Child 'C'	9y 4m	14y 1m	14y 10m
Child 'D'	11y 5m	17y 5m	18y 9m

Possible circumstances responsible for the high attainment scores reached by the nine Highly-Able pupils, one of whom was originally nominated by his teacher as an average pupil for inclusion in the Control Group, are:-

1) particularly favourable home environments providing encouragement from parents and exceptional facilities for learning;
2) stimulation and stretching at school through an enriched curriculum and/or acceleration;
3) harmony between home and school environments giving a high degree of emotional security; and
4) statistical errors.

It may be that the obtained values may be at least partly explained by statistical errors if the assumption of approximate linearity in the relationship between educational and mental ages should be incorrect and/or due to the use of NFER attainment tests probably designed primarily with children likely to score up to one standard deviation above or below the mean in mind. However, Pidgeon has shown that although "Theoretically there may be an upper limit to the possible score by any child, on any test" (ibid. p. 43) actual scores are likely to be below, if not equal to, this theoretical limit so that "the only safe assumption is that it is possible to raise all scores." In accord with Pidgeon's finding it seems probable that for groups of children the mean scores are likely to be below the theoretical limit no matter for what section of a distribution. Accordingly, it may be argued that the mean IQ values of 156 and 117 scored by the nine Highly-Able and six Control pupils fall below their theoretical IQ means. Alternatively, it may be claimed that the values depicting 'over-achievement' are merely the result of statistical errors of measurement. It cannot, however, be claimed that the anomaly here is due to a regression effect since approximately equal numbers of the subjects were assessed first on IQ as on scholastic attainment.

The above calculated values appear to pose a challenge for suitable curriculum stimulation to be provided for such Highly-Able children within the primary school. Further, a study of the beneficial or detrimental effects of affluence, deprivation or other environmental circumstances upon the scholastic achievement of Highly-Able pupils appears to be an area for future investigation.

(iii) 'Under-Achievers': An Attainment Quotient of 65 or less and/or a gap of four years or more between Mental Age and Educational Age in either English or Mathematics has been taken as the criteria for under-achievement by individuals in this study. The cut-off point has been chosen well below the theoretical Attainment Quotient of 100 since allowance must be made for errors of measurement and for the effect of regression. It is hoped that it is sufficiently low for the majority of educationalists to agree that under-achievement has occurred, for whatever reason, since the gap taken is twice that frequently used as a criterion of retardation on Schonell's recommendation (Revised Ed. 1948, p. 64) and as it exceeds considerably 2 yrs. 4m. taken by Yule as a criterion for retardation in Reading (1973).

Twenty Highly-Able children with an IQ of 174 scored below the above cut-off point in either English, mathematics or both. The attainment of several of the Highly-Able pupils was six years below their mental age. Upon the same criteria six Control children under-achieved, five in mathematics and one in English. The proportional occurrence of 'under-achievement' amongst the Highly-Able children is significantly greater than that found for the Control pupils ($p < .01$). The above findings are based upon the values given in Tables 8/2 and 8/3.

TABLE 8/2 **HIGHLY-ABLE 'UNDER-ACHIEVERS'***

(A) ENGLISH

Identification No.	IQ	Chronological Age		Mental Age		Educ. Age		Achievement Ratio ($\frac{EA}{MA}$ x 100)	Achievement INDEX DIFFERENCE MA - EA	
		y.	m.	y.	m.	y.	m.		y.	m.
31	162	7	2	11	5	6	11	60	4	6
2	168	5	10	9	4	5	4	57	4	0
8	143	6	0	8	4	5	4	64	3	0
55	167	10	5	18	2	13	11	77	6	3
52	177	9	5	16	8	12	3	77	4	5
56	168	9	11	17	4	11	11	69	5	5
46	213	8	11	19	6	13	4	68	6	2
38	181	9	6	17	6	12	8	72	4	8
49	158	9	1	14	9	10	8	72	4	6
43	196	8	11	17	9	13	2	74	4	7
				(B) MATHEMATICS						
29	164	7	10	12	10	8	4	65	4	6
14	170	7	7	12	10	8	10	69	4	0
61	165	10	10	18	9	14	2	75	4	7
39	193	9	8	18	11	14	11	79	4	0
				(C) ENGLISH AND MATHEMATICS						
27	201	7 7	6 6	14 14	0 0	9 8	5 1	67 58	4 5	7 11
60	149	11 11	3 3	17 17	7 7	12 13	8 3	72 75	4 4	11 4
67	190	11 11	2 2	21 21	2 3	16 16	6 6	77 75	4 4	8 9
68	143	11 11	5 4	17 17	1 0	12 12	11 10	76 77	4 4	2 2
40	170	9 9	7 7	16 16	10 10	12 12	0 7	71 75	4 4	10 3
42	207	8 8	7 6	17 17	11 9	11 11	6 3	64 63	6 6	5 6

*Criteria of 'under-achievement' adopted:- An Achievement Ratio of 65 or less and/or a gap of four years or more between MA and EA.

TABLE 8/3 CONTROL 'UNDER-ACHIEVERS'

(A) ENGLISH

Identification No.	IQ	Chronological Age		Mental Age		Educ. Age		Achievement Ratio ($\frac{EA}{MA}$ x 100)	Achievement INDEX DIFFERENCE MA - EA	
		y.	m.	y.	m.	y.	m.		y.	m.
15a	120	7	2	8	7	5	4	62	3	3
		(B) MATHEMATICS								
27a	124	7	2	8	10	5	9	65	3	1
48a	129	8	9	11	6	5	5	47	6	1
37a	125	8	10	11	3	7	4	65	3	11
33a	100	9	0	9	3	3	4	36	5	11
35a	129	8	7	11	1	5	10	53	5	3
		(C) ENGLISH AND MATHEMATICS								
		NONE								

(iv) 'Over- and Under-Achievement' Considered: The question arises as to why there should be such a great variation in the relative achievements of the Highly-Able pupils. It may be that since these children are by definition more mentally developed the span in achievement levels indicates that the Highly-Able are more susceptible to psychological and emotional influences in their environment in comparison with children of more average ability. Burt, (Yr.bk. of Educ. 1962, p. 42) has drawn attention to the great psychological stresses under which such children may suffer. In the present sample all the Highly-Able pupils enjoyed affluent home backgrounds, being drawn from the middle-classes and embourgeoised working-class in a period of prosperity. Nearly all the children attended modern primary schools of a high material quality.

9) Teachers' Opinions

(1) Estimates of Classroom Performance: There were marked differences between the levels of achievement of the Highly-Able children on the NFER Attainment Tests and the teachers' estimates of the pupils' standards of work compared to the average class performances in the school classes of which the children were members. Figure 8/1 (a) has been drawn on the assumption that the level of attainment in such classes on the NFER tests would not differ to any great extent from those on which the tests were standardised. Since the differences between the obtained scores and the ratings are considerable it seems probable that some incongruity between the means of the NFER tests and those of the school class performances in question would not alter the extent of the variation between the two gauges markedly.

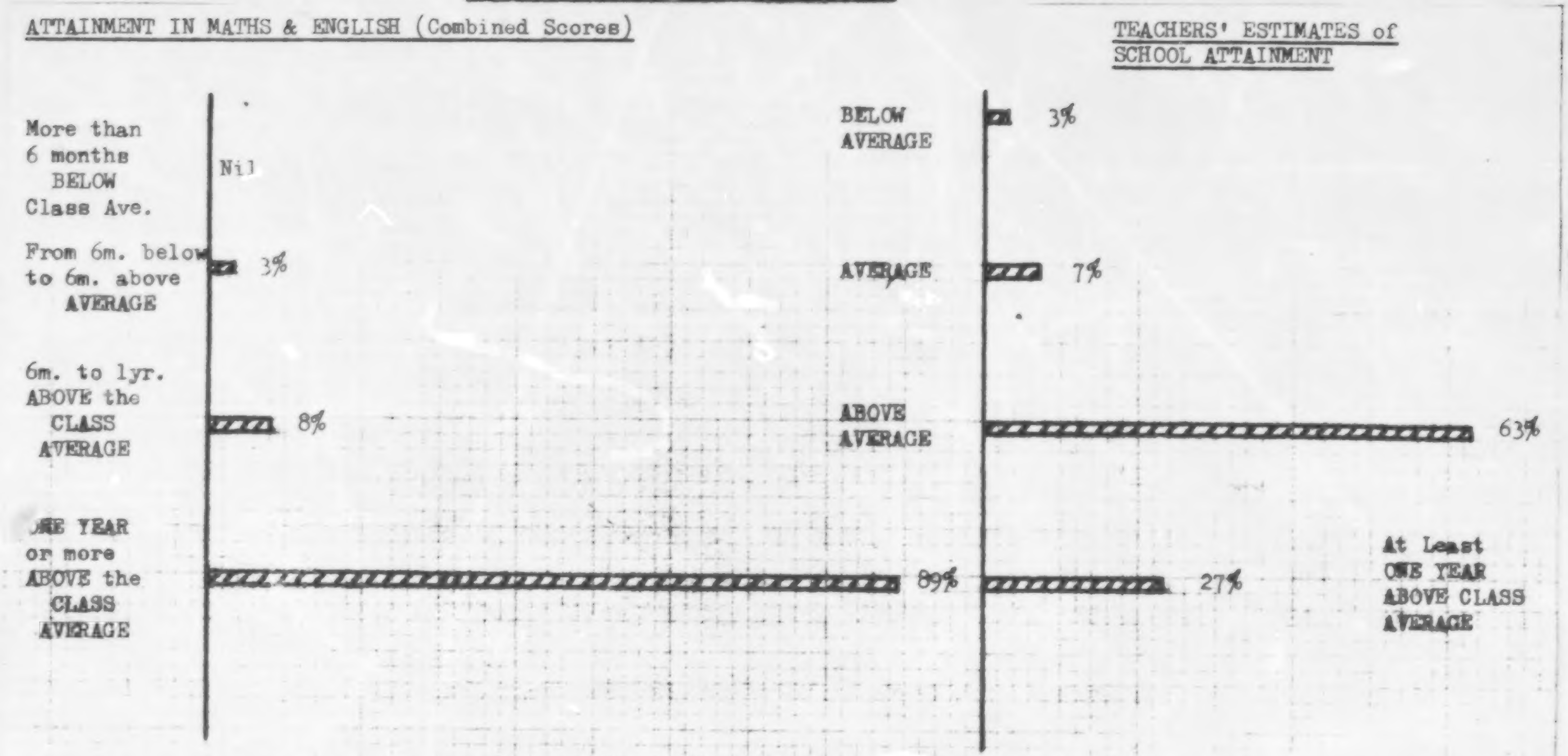
Nevertheless, it might be expected that the mean levels of attainment in the school classes involved in the present study would be higher than the NFER test means since the former included at least one child scoring an IQ of 140 or over, whereas many of the school classes upon which the tests had been standardised would not have done so. Consequently, it could be argued that the assumption that the mean levels of scholastic performance in the two sets of classes coincided was unjustified as the level of attainment in the classes participating in the present project would be higher. However, the mean attainment scores of the Control children (nominated by their teachers as representing their school class norms) do approach the theoretical norms of 100, so that the assumption of approximate congruity appears justified. The means of the scores concerned are given in Table 8/4.

TABLE 8/4 STANDARDISED SCORES OBTAINED FOR CONTROL GROUP

TEST	NO. WORKED	STAND. SCORE
READING	16	97
ENGLISH A.2	32	99.7
" B.2	11	100.1
" C.2	7	103.6
" D.2	13	100.7
" E.2	1	125.0
	64	Mean 100.3
Maths. Basic 'A'	24	95.01
" " 'B'	9	104.7
" " 'C'	16	94.1
" 'DE'	13	101.2
" 'FG'	2	110.5
	64	Mean 97.9

FIGURE 8/1 (a) **FIGURE 8/1 (b)**

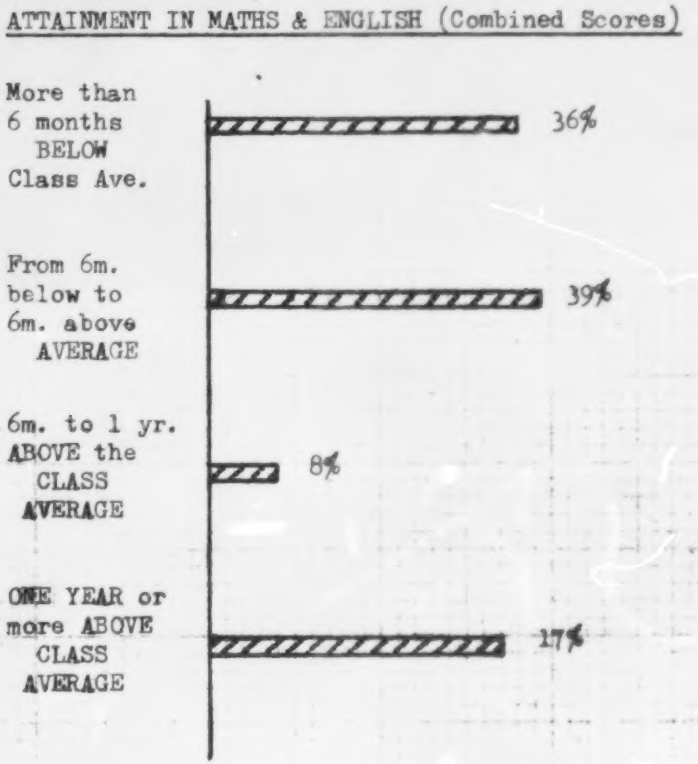
HIGHLY-ABLE GROUP (73 CHILDREN)

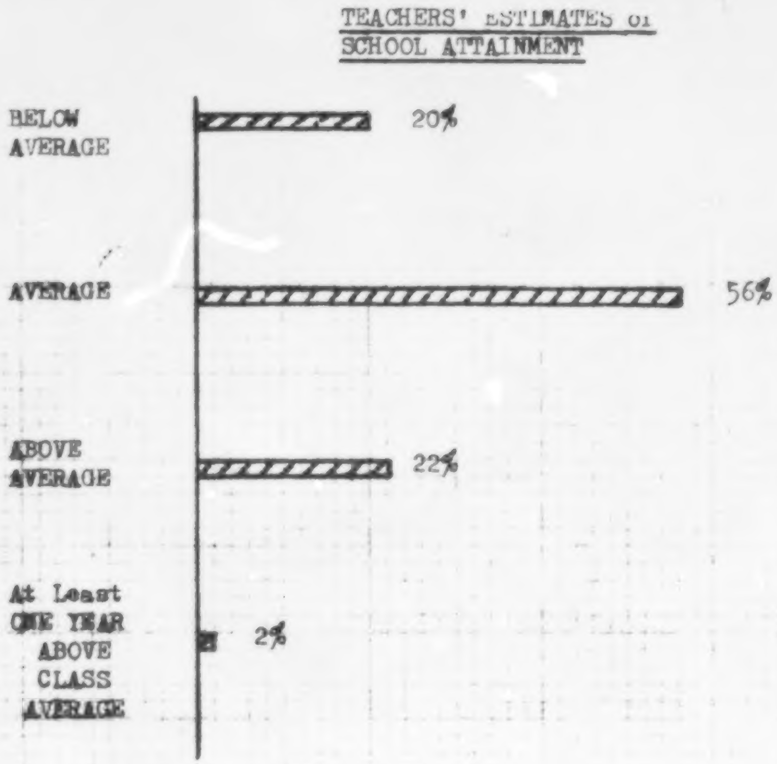


Note: Means of NFER Attainment Tests and Mean performances in English Language and Mathematics of school classes involved, assumed to coincide.

FIGURE 8/2 (a) **FIGURE 8/2 (b)**

CONTROL GROUP (64 CHILDREN)





Note: Means of NFER Attainment Tests and Mean performances in English Language and Mathematics of school classes involved, assumed to co-incide.

In considering the approximations of the levels of scholastic achievement reached by the Highly-Able Group made by the Attainment Tests and the teachers' ratings respectively, one may exclude the 27% of the Highly-Able Group (20 children) who obtained the highest combined Attainment Test scores, this being the proportion of the Highly-Able Group the teachers have indicated to be 'at least one year above the class average', and also the 11% lowest scores. The remaining 62% (see Fig. 8/1, 89% - 27%) of the Highly-Able sample achieved a combined attainment score showing them as having had an educational age of 1y 0m to 3y 9m above their chronological age and that for the median child as 2y 3m. The teachers showed the level of work of this 62% with a lower rating - that is, as less than one year in advance of the school class mean.

The teachers' estimates of the Control pupils' school attainment levels also differ in two respects from those shown by their attainment test scores; the teachers graded more of the Group as average whereas the pupils' test scores showed larger proportions as achieving both above and below the average category: secondly, according to their NFER test scores, the teachers under-rated the level of attainment of 15% of the Control Group (see Figures 8/2 (a) and 8/2 (b) - one year or more above class average: 17% less 2%).

Returning to the Highly-Able pupils, one may see there is a marked discrepancy between the estimates of their classroom performances by their teachers and the children's actual performance according to the NFER Attainment tests. The teachers' ratings show proportionately more pupils as below average or average for their school classes, and less than one-third as being 'one year or more above the class average' in comparison with the standards of performance indicated by the children's obtained NFER attainment scores. The variation between the two methods of estimating the sample children's progress is less marked for the Control Group.

It must be pointed out that the teachers were asked to grade the sample children's performance as a whole, whereas the NFER tests were given in English language and mathematics only. Since the teachers have indicated elsewhere (p. 298 (b) that for approximately 75% of the Highly-Able sample one of the 'Three R's' represented their best-performed subject area, it is unlikely that this discrepancy accounts for the differences between the attainment tests and the teacher estimates of the Highly-Able pupils' scholastic levels of attainment. Accordingly, it is suggested that there was classroom under-achievement (as defined on p. 335) by the Highly-Able Group.

A possible explanation of the relatively high mean NFER attainment test scores gained by the Highly-Able Group, compared with their teachers' estimates of the children's normal classroom standards of work, is that the pupils were more strongly motivated to perform at a high level in a test situation of a research project when they formed a small group separated from their classroom peers than when they were part of the usual larger classroom group.

(ii) Teacher Expectations: It has been said that objective attainment test scores are likely to be a superior estimate of gifted children's actual current capabilities as compared with their teachers' opinions of their normal classroom work (Pegnato & Birch, 1959). It seems probable, too, that in the present study the relatively higher NFER attainment scores are likely to have been the more accurate since the children did in fact produce work scoring at the higher level, although due allowance must be made for statistical errors.

Pigeon (NFER, 1970) has shown the great importance of teacher-expectations on the standard of work produced by pupils and how their performances may be improved when an assumption is made by their teachers that the children will produce a higher level of output. Figures 8/1 (a) and (b) show that according to the Highly-Able Groups' attainment test scores the current capabilities of 65% have been under-estimated by their teachers.[1] This 'extra' learning may have taken place outside the

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1) The difference between those scoring and rated one year above the school class average: 89% - 27% = 62% + 3% rated as below average = 65%. (Fig. 8/1).

school setting or, if a proportion of the greater knowledge was gained within the classroom, it apparently occurred to some extent at least without the conscious knowledge of the teachers concerned, and it suggests children may be partly covert as to their abilities. However, it is probable that the pupils higher level capabilities, which were sampled by the tests, could be raised still further if teacher expectations resulted in greater demands being made upon the pupils in terms of both quality and level of difficulty of output. Such a view is in agreement with that put forward by Bridges (1969, p. 5), who, referring to a group of very intelligent children at Brentwood, says:-

> "The children had long since become accustomed to a certain level of expectation on the part of their teachers and also probably of their parents. The result was that on the whole their level of aspiration or demand upon themselves was relatively low. For years they had mostly been coasting because they had found it easy with a certain amount of effort to maintain a good position in the class, and since the position proved satisfactory to both school and home they were satisfied."

Later, Bridges referred to the 'stint', a certain level of output with which the children had become accustomed to responding to adult expectations.

10) 'Educational Age' Relative to Curriculum Content

As already found (p. 333) an educational age of, say, 17y 6m, gained by a child in this study is not equivalent with the attainment in those areas of learning of average children of such older ages, since the curriculum upon which the calculation is based differs. Nevertheless, it seems reasonable to suggest that given the stimulation and teaching provisions at a higher level these children would be able to attain a standard in their normal school work which was at some intermediate position between that estimated by their teachers to be their current level and that shown by the extrapolated NFER score to have been their contemporary attainment age.

The manner in which more advanced teaching could be implemented in primary schools has been investigated by Tempest (1974). He showed that clever children may receive additional challenge by curriculum enrichment such as:-

1) the use of new work-cards devised by his team involving more diversified and advanced material than has been customary;
2) the introduction of German as a second language for 8 year olds;
3) the conduct of scientific investigations and the communication of the results (ibid. p. 43);
4) more advanced mathematics, including alegbra, practical geometry, programming on calculating-machines, and for fourth-year juniors, some experience with programmes of trigonometry, the use of a slide rule and by working through "a large part of the companion exercises to F. W. Land's 'The Language of Mathematics'." (ibid. p. 64).

Other appropriately designed teaching materials for use with Highly-Able pupils have been prepared by Ogilvie for the Schools' Council (1976). These involve specially developed programmes making use of work-cards, cassette recorders, etc. aimed at catering for intellectually advanced children within a primary-school class of children of their same chronological age.

The implementation of an enriched curriculum for Highly-Able pupils in primary schools is assisted by the provision of the new teaching materials available but appropriate practical application of these pre-supposes the prior identification of the Highly-Able pupils by their teachers.

SUMMARY

Identification of intellectually-gifted children has been found to be an initial problem. A threefold classification of Highly-Able pupils has been made:- i) the successful, ii) the maladjusted and iii) the covert.

The importance of scholastic attainment for society and the pupils themselves have been discussed. The occurrence of statistical errors and regression effects have been allowed for.

Types of scholastic achievement levels recognised in the pupils were:- a) classroom under-achievement - that is, performance in the class setting below that shown on attainment tests; b) 'over-achievement' and c) 'under-achievement' in relation to mental age.

Teacher expectations of the Highly-Able Group have been considered to be low relative to their actual performances and measured ability. If higher achievement goals were set for the intellectually very able children and appropriate adjustments were made to the curriculum, it seems likely that higher standards of attainment would be realised.

Part II - Discussion and Conclusions

The Questionnaires

11) Physical Considerations

Over a half of the Highly-Able and a third of the Control pupils were first-born children. Pidgeon (1967) has shown the importance of birth position in language development and a question which might bear further investigation is the relationship between high intellectual ability to position in and the size of family. There was little difference between the Highly-Able and Control Groups in physical size and in health record.

The information from the teachers on the relative sizes of the sample children in their school classes was requested to discern whether, if it became normal practice to accelerate Highly-Able children to school classes a year senior in order that they might have additional stimulation in their school work, they would be at a comparative disadvantage in respect of their physical size. Considering Highly-Able children as a group it seems such would be the case but this generalisation should be taken against the wide variation in size existing between individual Highly-Able children.

The school attendance rates of both the Highly-Able and Control Groups have been shown to be high. Apart from eliciting information on this point, since absence from school would affect the results on relative standards of scholastic performance, this question was designed to indicate the accuracy with which the questionnaire forms were completed by the parents and teachers. The remarkable co-incidence of the replies from the two sources reflects the care with which the respondents completed the forms.

12) School Situation

(i) Liking for School: A cheerful and pleasant environment was found in the participating schools and the great majority of the sample children were shown by the responses to like school. A measure of the reliability of the children's replies is given by the answers to a subsequent check question where almost the same proportions of both Groups as had previously shown marked favour for school chose to be at school during term-time rather than at home or somewhere else.

As regards the remaining minority of the Highly-Able Group, the 15% shown in the results as having reservation regarding their appreciation of school may understate the number of children involved since, when the individual questionnaires were examined, about half of this set of parent-forms failed to agree with those of their off-spring so that the total number of pupils association with a negative reply exceeded the 15% found among either the parents' or children's responses. It seems possible that some of the pupils may have hesitated to admit an attitude not in accord with the majority of their peers.

The main difference between the two sample Groups on the supplementary question was that most of the Highly-Able minority section stated a preference for being 'somewhere else' while the Control children's choice was to be 'at home'. It may be that the replies of the Highly-Able children reflect a wider span in their interests co-inciding as it does with a greater spread in their activities shown elsewhere on the questionnaire. It seems that school may be less popular with the Highly-Able as compared with the Control children because replies elsewhere on the questionnaires (home hobbies) suggest that some of the less intellectual activities in the curriculum receive limited favour with the Highly-Able Group since the level to which they may pursue particular interests is to some extent restricted and they have less opportunity to follow one of their preferred occupations. Also the noise interrupts them when they wish to read quietly and they are rather less popular with their peers.

A comparison of the parents' responses with those of their off-spring showed that the Highly-Able children's parents over-estimated the juveniles favourable feelings towards school and under-rated their negative reactions: the converse was the case with the Control pupils' parents. A proportion of the Highly-Able children's parents appear to have been able to gauge approximately the levels of their children's intellectual capacity but were less correct in associating a given degree of ability with a corresponding measure of liking for school.

(ii) School-day: For the majority of the Highly-Able children play-time was the most favoured part of the school day although a proportion preferred being in the classroom. The parents of both the Highly-Able and Control Groups under-estimated their children's stated liking for being in the hall for music, films, etc.

The differences in emphasis regarding the preferred parts of the school day as between children and parents is rather greater for the Highly-Able Group. Possibly it indicates that the parents of the Highly-Able have slightly less understanding of their off-springs' interest in the classroom - perhaps a reflection of a wish on their own part.

(iii) Classroom Work: It was surprising to find that the largest proportion of the total sample of children preferred to work on their own in the classroom, a number elaborating by giving such reasons as, 'It's quieter' and 'Because noise interrupts me' (p. 240). Some supporting evidence as to the children's feelings upon classroom organisation is provided in the spontaneous remarks by four parents, three of the Highly-Able and one of a Control child, who volunteered the information that their off-spring preferred to work alone. It was also unexpected to find that a quarter of the Control Group and a sixth of the Highly-Able pupils preferred the more traditional form of classroom organisation. It may be that when the teacher addressed the class as a single unit there was more order and quiet and that it was for such conditions that the children expressed a preference as was explicitly stated by some of the pupils preferring to work on their own. The Juniors were asked a supplementary question as to whether they preferred to work all the time or only some of it in the manner they had previously selected to which only 14% of each Group chose the first option. Since one would not expect a set of children to wish to work on their own for the whole of the time their replies seem to indicate they understood both the main and supplementary questions.

The teachers organised their classes in modes and in proportions which coincided approximately with the children's stated preferences, the chief differences being for the sixth of the Highly-Able and the quarter of the Control children who said they preferred classes to be taught as a unit whereas only 5% and 7% of the Groups respectively were taught in this manner.

It is suggested here that classroom organisation for the brighter child is an area which would reward further inquiry. The main reasons for the large proportion of the sample children working on their own were presumably that they were at a more advanced stage with their studies and were less disturbed with their work. There may be a correlation between the desire for such conditions of study and the cognitive ability to learn. Why a noteworthy minority of both sample Groups preferred the class to be taught as a unit also appears to be a question worthy of further investigation.

The greater attentiveness of the Highly-Able children as compared with the Control Group found in this study is despite approximately equally large proportions of the two Groups being found to like school, (p. 238 and p. 296). It is of interest to note that pupils scoring very highly on intelligence tests are reported by their teachers as showing greater powers of concentration in the classroom.

(iv) Classroom Performances and Preferences: The issues raised in this section are central to the present thesis. Earlier in this chapter (p. 320) the question was asked as to whether normative attainment levels in English language and mathematics by the Highly-Able sample were to be considered as satisfactory. In this connection the pupils' levels of performance in other areas of the curriculum is relevant.

The parents of the Highly-Able Group accurately estimated their off-springs' curriculum preferences as being Reading and Mathematics and that Pottery & Craft and Music & Movement had least popularity although these were included in the wide spread of interests enjoyed by their children. Similarly, the same curriculum areas, Reading and Mathematics & Science, are named by the teachers as being the best-performed by the largest proportions of the Highly-Able Group while an intermediate position is taken by Creative Writing and Project and the most rarely named are Painting, Pottery & Craft and Music & Movement.

The teachers failed to name a curriculum area in which the Highly-Able children's classroom performances were weakest for almost a quarter of the Group. Conversations with some teachers suggested that the success of the Highly-Able pupils in producing work of a good quality over most areas of the curriculum was the explanation for omissions here. Music & Movement, Painting and Creative Writing were the three subject areas in diminishing order of frequency for which the responses for three-quarters of the Highly-Able Group showed them to be weakest.

There is a considerable degree of agreement between the three sets of questionnaires regarding the classroom activities of the Highly-Able Group, the teachers indicating that the pupils executed their best work in the 'Three R's' while the best-preferred subject areas were shown by the children and their parents to be Reading and Mathematics & Science, although the children awarded less favour to Creative Writing and the parents under-estimated their off-springs' pleasure in reading and over-estimated their liking for Creative Writing. The lower popularity of Pottery & Craft and of Music & Movement was matched by relatively lower performance levels.

Creativity may find expression in any area of the curriculum and some at least of the relatively large proportion of the Highly-Able pupils considered by their teachers to attain 'best' in one or more of the 'Three R's' may have displayed creative ability. However, on account of the complexity of the subject matter the present project has not been designed with the objective of examining the scholastic performance levels of children with high measured IQs other than, as has already been stated, in English and Mathematics (see p.139). Nevertheless, it is perhaps surprising to find how limited has been the interest shown in the questionnaires in such creative arts as Music & Singing, Pottery & Craft and Painting & Drawing. Only one child for each of these three subject areas has been shown by their teachers as performing 'best' in these parts of the curriculum; of the children themselves, five indicated their first preference from a list of alternatives was for Music & Singing, three for Pottery & Craft and one for Painting - the parents of only one child believed, for each of the three subject areas, it to be their child's first preference. However, a considerable proportion of all three sets of respondents included one or more of the fore-going creative arts among other areas of the curriculum without specifying any order of preference.

Turning to the Control Group in the above context, the classroom performances and preferences were far more evenly distributed over the curriculum. Reading and Mathematics & Science obtained the largest percentages of choices by the children but the proportions of their total selections were smaller than in the case of the previous Group, while Pottery & Craft were more frequently named. The parents of the Control pupils diagnosed their off-springs' preferences less accurately for although they correctly included Reading as among their children's 'emphatic likes' and Project in an intermediate position, they under-estimated seriously their children's liking for Mathematics & Science and to a lesser extent the popularity of Painting & Drawing.

Over a quarter of the Control children were 'poorest' in Creative Writing and half of the Group was weakest in one of the 'Three R's'. Most of the other parts of the curriculum were shown to be an area for which 10% - 12% of the Group had the lowest attainment level. This result was in accordance with a similar spread of those subject areas which the teachers selected as being the ones in which the Control children performed best.

The patterns which have emerged from the sets of forms regarding the Control children's preferences and their school class performances were less clear-cut but relative to their ability there was a tendency for the Control pupils to have a rather stronger leaning towards that part of the curriculum concerned with arts and crafts as compared with the Highly-Able Group.

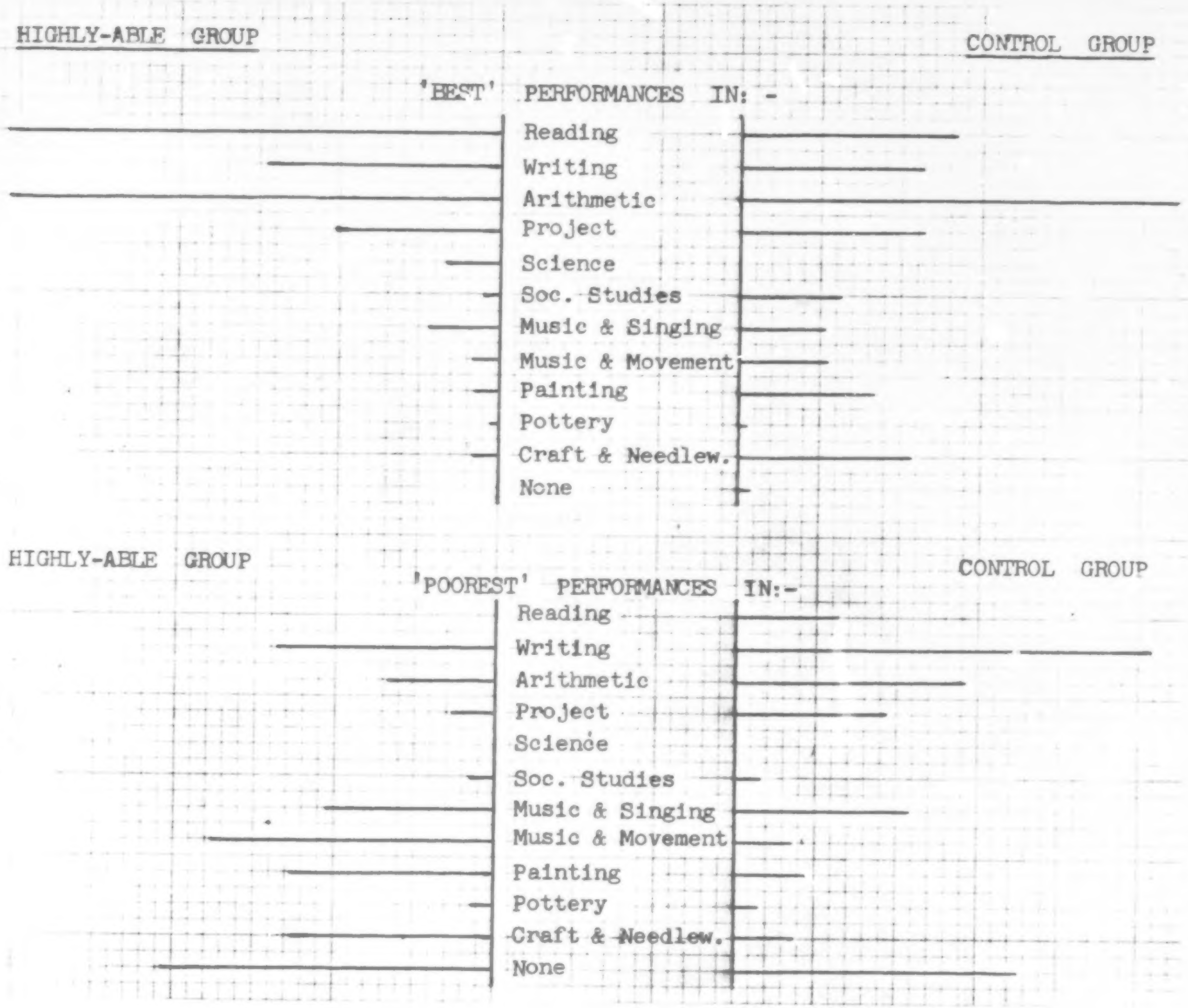
As regards the Highly-Able Group, it seems that should their performances on the English language and mathematics attainment tests, relative to their measured ability and in comparison with the Control Group, be taken as a guide to the general level of their scholastic class-work that it would be more likely that this level would be an

TABLE 8/5 **TEACHER RATINGS OF SAMPLE CHILDREN'S 'BEST' & 'POOREST' PERFORMED SUBJECT AREAS (All values in percentages).**

SUBJECT AREAS	(A) 'Best-Performed' Subject Areas		(B) 'Poorest-Performed' Subject Areas	
	Highly -Able Group	Control Group	Highly -Able Group	Control Group
Reading	30.89	13.13	-	6.25
Writing	14.60	11.43	13.70	25.78
Arithmetic	30.62	27.20	6.85	14.06
Project	10.03	11.26	2.74	9.38
Science	3.3	-	-	-
Soc. Studies	0.93	6.10	1.37	1.56
Music & Singing	4.40	5.13	10.28	10.94
Music and Movement	1.85	5.33	17.81	3.90
Painting	1.81	8.38	12.78	4.69
Pottery	0.36	0.52	1.14	1.56
Craft & Needlework	1.18	10.73	12.78	3.90
None	-	0.78	20.55	17.97
TOTAL	99.97	99.99	100	99.99

FIGURE 8/3 TEACHERS' RATINGS OF PUPILS' PERFORMANCES

(Percentages)



over- rather than an under-estimate. The foregoing may be deduced from the teachers' ratings of the classroom standard of work of most of the Highly-Able pupils (see Fig. 8/1). Accordingly, it may be that there was a greater degree of under-achievement in other curriculum areas, including those which are creative, and it seems that hypothesis to this effect would be worthy of investigation. Nevertheless, for the majority of the Highly-Able Group the classroom performances were both all-round and above the average for their school classes.

In the case of the Control Group, their measured intellectual ability was lower and the gaps between their mean IQs and the levels of attainment displayed in English language and mathematics were narrower than was found to be the case with the Highly-Able Group. However, the Control children were rated by their teachers more frequently to have as their 'best-performed' subject area in a part of the curriculum other than those covered by the attainment tests used in this study. Therefore, it appears that overall the levels of performance of the Control Group show a fuller utilisation of their potential than in the case of the Highly-Able pupils.

Comparing the scholastic performances and preferences of the Highly-Able and Control Groups, the present study has found no indication that the high level of intellectual ability, indicated by the Stanford Binet test to be possessed by the Highly-Able pupils, has found expression in parts of the curriculum other than those examined through the use of attainment tests. The indications are that, relative to their standards of achievement in the 'Three R's', their attainments in the graphic arts, craft, etc. are at a lower level. There is reason to suggest, therefore, that under-utilisation of the potentialities of the Highly-Able Group was taking place and represented a wastage of resources. It is suggested here that if provisions were made to cater for the more rapid rate of learning found among the Highly-Able sample this would be beneficial for both the children themselves and make more efficient use of the economically scarce resources allocated to educational institutions by society.

(v) Outdoor Games & Swimming: It appears that the level of interest and performance of the Highly-Able Group was about average, or slightly below, in attainment in school physical activities while that of the Control Group was rather above the average in their school classes. There is closer agreement between the parent and teacher questionnaires as to the parents' views on the popularity of outdoor games and on the teachers' ratings of the pupils' standards of performance than with the children's own replies. The low values of 4% for the Highly-Able and 6% for the Control children's stated preferences for this side of the curriculum as compared to that taking place inside the classroom may have resulted from the children not considering to the same extent as the adults that outdoor games and swimming were an integral part of the curriculum and accordingly they did not name it as one of their favoured school pursuits.

From the information supplied the Highly-Able pupils appeared poorer at physical activities than the Control Group and attained standards rather below the averages for those school classes of which they were members, while the Control children's levels were above such means.

Considering the overall curriculum and comparing the two sample Groups, this study has found that in relation to both interest and performance, the Highly-Able pupils were relatively more orientated towards classroom study and by comparison the Control Group leaned more towards physical activities.

13) Additional Teaching at Home:

Almost twice as many of the Control children's parents as compared with those of the Highly-Able Group were found in this study to have been involved directly with their children's education. A direct or indirect contribution to their off-spring's school learning was made by large proportions of the parents of the Highly-Able (85%) and of the Control children (60%). It seems probable that the parents under-stated rather than exaggerated the additional teaching provisions they made since some may have believed that such measures would not have met with the approval of the schools concerned.

Possible explanations of the difference between the two sets of parents may be that the Highly-Able children learnt more repidly from the environment without specific teaching than did the Control children and that although relative to their ability the gap between what they might have been able to attain and what they did in fact learn might have been greater, nevertheless, they came up to a standard satisfactory to the parents and accordingly the latter did not take additional measures aimed at assisting their children's school progress. This deduction is in line with the viewpoints expressed by both Tempest (1971) and Bridges (1969) in whose opinion 'gifted' children are able to satisfy both their parents and teachers in the level of work which they produce without exerting themselves to use their capabilities to the full. It follows that if the level of parent expectations is roughly on a par for children as a whole in the same socio-economic group, it may be expected that where there are average or bright-average children whose work is below such a parental threshold level then the latter children may receive extra stimulation and teaching, whereas the Highly-Able Group do not do so as the work which they perform satisfies parental demands. Such children may be performing at a level below the standard of which they are capable but this fact passes unnoticed.

It seems logical to expect that, if the Highly-Able children received similar additional stimulation to that afforded to the Control Group, but in accord with their particular circumstances, their levels of attainment would be raised. It might be, too, that if resources allocated generally to the development of intellectual talent were augmented in proportions corresponding to those already and justifiably provided for less-able children, the competent standards of attainment currently reached by high IQ pupils, would, it might be anticipated, be raised still further. Hirst (1961, ed. Wiseman, p. 338) supports this view, stating that as it is unlikely that education in any society maximises the potential of the individuals of which it is composed that it might be possible to increase the average level of intelligence with the population substantially and he continues:-

> "In view of the interaction between genotype and environment, it would be probable that individual differences would be increased and that the biggest gains would occur in those genotypes with the highest hypothetical potential."

More recently (Jensen, 1972, p. 85) stated that while the genetic factors are completely laid down when the parental sperm and ovum unite, "the individual's genotype, by definition is "fixed" at the moment of conception." He continues:-

> "But beyond conception whatever we observe or measure of the organism is a phenotype and this by definition, is not 'fixed'. The phenotype is a result of the organism's internal genetic mechanisms established at conception and all the physical and social influences that impinge on the organism throughout the course of its development. Intelligence is a phenotype, not a genotype, so the argument about whether or not intelligence is 'fixed' is seen to be spurious."

It was perhaps the importance of the phenotype in respect of intelligence that led Pidgeon, at an earlier date, to write:-

> "The idea that we can teach children to be intelligent in the same way that we can teach them reading or arithmetic may

take some getting used to. But perhaps the greatest changes are still to come."

(Educational Research, No. 6, May 1969 'Intelligence; A Changed View')

14) Friendships

More than half of both sample Groups showed a preference for the company of other children, most of them having a friend, or friends at school and their parents confirmed this. The chief difference between the Highly-Able and Control children here was that, of the remainder whereas over a third of the latter Group chose to be with their parents, a smaller percentage of the Highly-Able children selected this option, the other proportion either not replying or choosing to be with adults.

Twice as many of the parents of the Highly-Able Group compared to those of the Control children believed their off-spring preferred the company of older children. This finding is in line with the view expressed by O'Shea (1960, ed. Barbe and Renzulli). already discussed (see p. 71). If, as it appears, the out-of-school associates of the majority of the Highly-Able Group are those senior to themselves, the question arises as to whether they might be assimilated into an older age group in school which might not only provide learning conditions more suitable for their mental development, but also be giving them a more amenable social environment. This possibility must, of course, be weighed against the effect of more diminutive physical size (see p. 293) due to lower chronological age.

The teachers showed the majority of the sample to be of average popularity in their school classes, the main difference between the Groups being the 17% of the Highly-Able but only 3% of the Control Group described as not popular with the peer group. There is only partial agreement between the questionnaires completed by the sample children, their parents and teachers as to those individuals not popular with their peers, since of the thirteen names mentioned only four appear on two of the three forms. Accordingly, the validity of the replies in this respect must be considered doubtful.

The sets of responses on social relationships from the three sources for the Control Group overall were largely in accord but there were again differences in respect of those few individuals (four) who are not well-adjusted with their peer groups.

On average the Highly-Able Group were found to have been less popular than the Control children and among them a larger proportion tended to have poor social relationships with their peer group. For both Groups there were inconsistencies between the sets of three replies concerning those children thought to suffer a degree of unpopularity. It seems possible that there was an element of understatement here, one or other of the three parties hesitating to describe a child as friendless lest it showed the individual in an unfavourable light. It is suggested that the most likely explanation as to why the Highly-Able children tended to be less popular with their peers was their greater interest in intellectual pursuits, their desire to probe more deeply into those interests which they enjoyed or their wish to study at a more advanced level, as was indicated by the general remarks made by their parents and teachers. The three sets of respondents were agreed regarding the Highly-Able children's great pleasure in reading, the very nature of which is anti-social.

15) Home Interests

The parents were in a position to observe their children's preferred home occupations. The replies of the children and the parents were roughly in agreement but both sets of parents showed inaccuracies in judging their off-springs' stated likes since they over-estimated their interest in reading and sport and under-estimated their pleasure in watching TV. As the parents may have felt less approval for TV viewing than for the other two occupations, it seems possible that their own wishes coloured their stated opinions.

The popularity of Outdoor Games & Swimming with the Highly-Able Group reiterates their juvenility and enjoyment of childish activities. This finding is in agreement with observations made on 'gifted' children during the course of the 'Brentwood Experiment' (Bridges, 1969, p. 32 - 33). The favour accorded to watching TV by the Highly-Able Group may be a pointer in the same direction but since no information is available as to the type of programmes viewed it cannot be assumed to be the case. Nevertheless, the high intellectualism of this exceptional set of children was shown by their extensive interest in reading and their lesser but still noteworthy preoccupation with problem-solving activities such as those involved in the solution of mathematical problems.

16) Parents' and Teachers' Remarks

The parents' remarks suggested that characteristics otherwise similar within the two sample Groups were held to more extreme degrees among the Highly-Able children; the teachers' comments, too, seemed to have implied a tendency for the Highly-Able pupils to have possessed particular features with greater intensity than was the case with the Control pupils. There appears to have been no correspondence between high intellectual ability and particular personality characteristics in this sample of exceptional children.

The superior intelligence of the Highly-Able pupils was seen during the course of their day-to-day activities whether by their speed and intellectual competence in the school classrooms or in their greater interest in thought-provoding activities at home. The Control children appeared to have been more popular with their peer groups in school and to have had a general interest in a wide variety of occupations at home but, where intellectual processes were involved, frequently to have engaged upon them at a more superficial level by comparison with the Highly-Able Group.

CONCLUDING REMARKS

The distinguishing feature of Highly-Able children, as defined in this study, is their superior intellectual qualities. Such pupils present a problem not found in their less-able contemporaties - that the high level of reasoning powers which they possess may well exceed that of the adults in whose charge and under whose authority they have been placed. The children's superior intellectual ability is generally not matched by knowledge as they have had insufficient time to make their own the distilled wisdom of previous generations. Frictions may arise between a frustrated highly intelligent and inexperienced child and a competent and experienced, but otherwise unexceptional parent or teacher.

Highly-Able children may use the great powers of learning and reasoning they possess for objectives different from those considered to be socially desirable by their elders - since there is no reason to assume that the children's current aspirations are necessarily those of the adults in the world in which they live any more than is the case with other children. The difference between the Highly-Able and their less-able peers is that the former have the ability to use their intellectual gifts in their own immediate interest and have mental skills such that they may deceive the person in whose charge they are placed, whereas other children have not such capabilities. The problems associated with covert Highly-Able children are not new - they were already recognised by Rousseau (1762, Everyman ed. 1954 , p. 70 - 71):-

> "As a child, the young Cato was taken for an idiot by his parents; he was obstinate and silent, and that was all they perceived in him;"

and he continued, recounting that the Abbé de Condillac was

"reckoned a fool by his family."

The present study has been concerned with the scholastic attainment levels, relative to their measured ability, of two groups of children both being drawn from the middle classes and the embourgeoised working-class so that differences found between the two sets of pupils cannot be ascribed to social deprivation. Reading attainment was similar for the two groups but the Highly-Able infants were less advanced than the Control children for mathematics while the Highly-Able Group as a whole attained at a relatively lower level in English language.

Repeated references to the importance of the peer groups as regards levels of scholastic attainment of highly intellectual children are made by Bridges (1969) and Tempest (1971). The Highly-Able are under pressure to conform to the standards of their peers both in forms of dress, in general behaviour, in the level of their academic work, and in their recreational pursuits. The standards set by the child peers may not conform to those held by their parents and teachers. Such difficulties exist irrespectively of intelligence, the difference being that such irregularities as do arise are likely to be more difficult to detect and control when occurring among the intellectually talented.

Prior to the establishment of criteria within which under-achievement, as defined in this study, (see p. 338) might be said to occur generally, additional provisions required would include:-

a) a randomised sample of Highly-Able children - such has not been available in this nor in previous studies, and,

b) statistically reliable tests for assessing the scholastic attainment levels of children in the top 2% of the intelligence continuum.

As regards an improved instrument for the assessment of measured ability, it is anticipated that this will be provided by the new British Intelligence Test currently in its final stages of development.

Knowledge of the characteristics and distribution of intellectually gifted children might be obtained from a random sample of such children covering the three categories named - the successful, the maladjusted and the covert. An unbiased sample might be identified by the selection of several Local Education Authority areas chosen so as to provide a balance of social class composition, economic standards and emigrant population. In these areas a 10% random selection of the primary schools might be taken and their junior pupils be screened with a group intelligence test. Those children scoring above a relatively low cut-off point might then be examined further by a battery of tests similar to those devised by Pegnato and Birch (1959).

As regards the scholastic achievement levels of high-ability pupils assessment of their standards of attainment would be facilitated by the production of tests encompassing a greater range of difficulty in the test items. In this way a ceiling might be provided for the Highly-Able children, yet Control children would be enabled to score on the same test so that comparative standards of achievement might be gauged on a single instrument.

The present project claims only to be a pilot study with the limited objective of throwing added light on some features of pupils shown by the Stanford Binet Intelligence scale as having exceptional ability. It has been established that such children are to be found in Local Authority primary schools and that a number of them are unrecognised by their teachers. Within the limits mentioned above, there appears also to be reasonable grounds to suggest that the capabilities of some children in this category were so superior that even where they were recognised by their teachers the pupils were not attaining up to the levels of which they were capable. According to the attainment test scores obtained, a great spread existed between the apparent high and low standards of achievement of individual Highly-Able pupils although of similar measured intelligence. This finding raises the question as to why this should have been the case. At the same time, considering the Highly-Able children as a Group, according to their teachers, they performed relatively less well in other areas of the curriculum than in mathematics and English for which the attainment test scores were obtained. Accordingly, these findings point to a waste of resources - for the children of learning time and for society by the inefficient utilisation of educational facilities. Another outcome of interest is that the majority of the parents of both Groups of children assisted their off-spring with their school-work - either directly or indirectly. It would be interesting to know to what extent this practice has become general among other social classes as a result of the raised educational standards of parents in this country.

A great deal of work needs to be done to confirm or refute some of the possibilities and probabilities that have been found in this study and particularly to give consideration to the scholastic environment of intellectually gifted children among the less-favoured social and economic classes and where schools are less forward-looking and less well-staffed compared with those covered by this study. It is suggested that any shortcomings which have been found to exist in the environment of Highly-Able pupils here are likely to be found to a greater degree in less well-favoured socio-economic conditions.

The growing recognition of the importance of the full educational, moral and social development of intellectually highly-able children has been underlined by the recent 'World Conference on Gifted Children' held in London (1975) which was attended by delegates from fifty-five states, including industrial and under-developed countries and those with different political systems and religions. Among the peoples represented were: the U.S.A., Brazil, Ghana, Bulgaria, India, Kuwait, Israel, New Zealand, etc. United Kingdom representatives included those from the Department and Science, Local Education Authorities, universities, institutes and colleges of education, schools, professional organisations, medical personnel, psychiatrists, psychologists, teachers, social and welfare services. Parkyn and Torrance were among the main speakers.

Reports given from a number of the foreign delegates showed the increased interest and concern about gifted children current in their respective countries (Gibson & Chennells, 1976). In the United States leaders are being trained to develop work with gifted children, in Israel experiments are in progress with special classes for the gifted in selected primary schools and in India teams of specialists are seeking out talented youth in the provinces. A second world conference will be held in California in 1977 and an international committee has been set up to co-ordinate research and other endeavours on behalf of gifted children.

In a letter to 'The Times' (20.9.1975) a Soviet official referred to special schools in the U.S.S.R. for the academically gifted in mathematics, science, languages and for the cultural arts. He explained that children were selected as a result of three rounds of 'Olympiads' and special studies for three weeks in a summer camp, solely upon the 'gifts of a child' since, he adds later, 'such youth is the golden fund of any State'.

It is to be hoped that the renewed world-wide interest in the full development of intellectually and creatively gifted children may promote benefits for all and that this country can contribute to knowledge so that the talents of the intellectually very able may be brought to fruition for their own benefit and that of society. The importance of gaining an understanding of children of superior intelligence was already recognised by Wall in 1960 when he stated:-

> "However we interpret the term and wherever we draw the border, high intelligence is probably the most precious of a community's social and economic assets. From gifted individuals come the sources of creativity, of leadership and of progress on all levels - moral, ethical, artistic, scientific and political. On the other hand, apart altogether from the social and economic loss caused by the wastage of unused ability, the highly intelligent maladjusted or anti-social individual can be a greater threat to his fellows and to his society than his less able contemporaries."
>
> (The Education of Exceptional Children II - 'Highly-Intelligent Children' - Pt. 1, W. D. Wall).

APPENDIX A

TABLE A/1 73 EXPERIMENTAL GROUP CHILDREN

CHRONOLOGICAL AGE AND STANFORD BINET SCORE

IDENT NO.	CHRON. AGE	MENTAL AGE	IQ
1	4yrs 7m	8yrs 4m	184
2	5yrs 6m	8yrs 10m	168
3	5yrs 7m	8yrs 6m	159
4	5yrs 9m	9yrs 2m	167
5	5yrs 9m	10yrs 0m	183
6	5yrs 10m	8yrs 0m	142
7	5yrs 10m	8yrs 0m	142
8	5yrs 11m	8yrs 2m	143
9	6yrs 4m	9yrs 2m	149
10	6yrs 5m	9yrs 8m	155
11	6yrs 6m	9yrs 0m	142
12	6yrs 8m	11yrs 4m	176
13	6yrs 8m	9yrs 6m	146
14	6yrs 11m	11yrs 6m	170
15	6yrs 11m	11yrs 0m	163
16	6yrs 11m	10yrs 6m	155
17	7yrs 0m	10yrs 4m	150
18	7yrs 1m	12yrs 7m	182
19	7yrs 2m	10yrs 4m	143
20	7yrs 2m	11yrs 0m	156
21	7yrs 3m	10yrs 4m	144
22	7yrs 4m	12yrs 6m	174
23	7yrs 4m	12yrs 0m	166
24	7yrs 5m	10yrs 8m	145
25	7yrs 6m	10yrs 8m	143
26	7yrs 6m	11yrs 8m	157
27	7yrs 7m	14yrs 2m	201
28	7yrs 7m	11yrs 6m	153
29	7yrs 9m	12yrs 8m	164
30	7yrs 9m	11yrs 4m	146
31	7yrs 11m	12yrs 10m	162
32	7yrs 11m	13yrs 10m	175
33	8yrs 0m	11yrs 10m	147
34	8yrs 0m	11yrs 8m	145
35	8yrs 2m	13yrs 10m	168
36	8yrs 3m	12yrs 8m	152
37	8yrs 4m	14yrs 4m	171
38	8yrs 4m	15yrs 2m	181
39	8yrs 5m	16yrs 5m	193
40	8yrs 5m	14yrs 6m	170
41	8yrs 6m	12yrs 6m	145
42	8yrs 6m	17yrs 9m	207
43	8yrs 7m	17yrs 1m	196
44	8yrs 8m	14yrs 10m	168
45	8yrs 9m	14yrs 10m	166
46	8yrs 10m	19yrs 2m	213
47	8yrs 11m	13yrs 2m	144
48	9yrs 1m	11yrs 8m	147
49	9yrs 1m	14yrs 8m	158
50	9yrs 4m	14yrs 4m	149
51	9yrs 4m	13yrs 6m	141
52	9yrs 6m	16yrs 10m	177
53	9yrs 7m	15yrs 4m	156
54	9yrs 7m	14yrs 8m	148
55	9yrs 10m	17yrs 1m	167
56	10yrs 1m	17yrs 8m	168
57	10yrs 1m	16yrs 0m	153
58	10yrs 3m	15yrs 4m	144
59	10yrs 6m	19yrs 0m	173
60	10yrs 8m	16yrs 8m	149
61	10yrs 8m	18yrs 5m	165
62	10yrs 9m	16yrs 2m	144
63	10yrs 10m	16yrs 5m	145
64	10yrs 11m	16yrs 9m	147
65	10yrs 11m	16yrs 4m	143
66	10yrs 11m	18yrs 6m	161
67	11yrs 1m	21yrs 1m	190
68	11yrs 5m	17yrs 1m	143
69	11yrs 6m	17yrs 6m	145
70	11yrs 7m	18yrs 5m	151
71	11yrs 7m	17yrs 5m	143
72	11yrs 8m	19yrs 2m	156
73	12yrs 10m	18yrs 10m	141

TABLE A/2 64 CONTROL GROUP CHILDREN

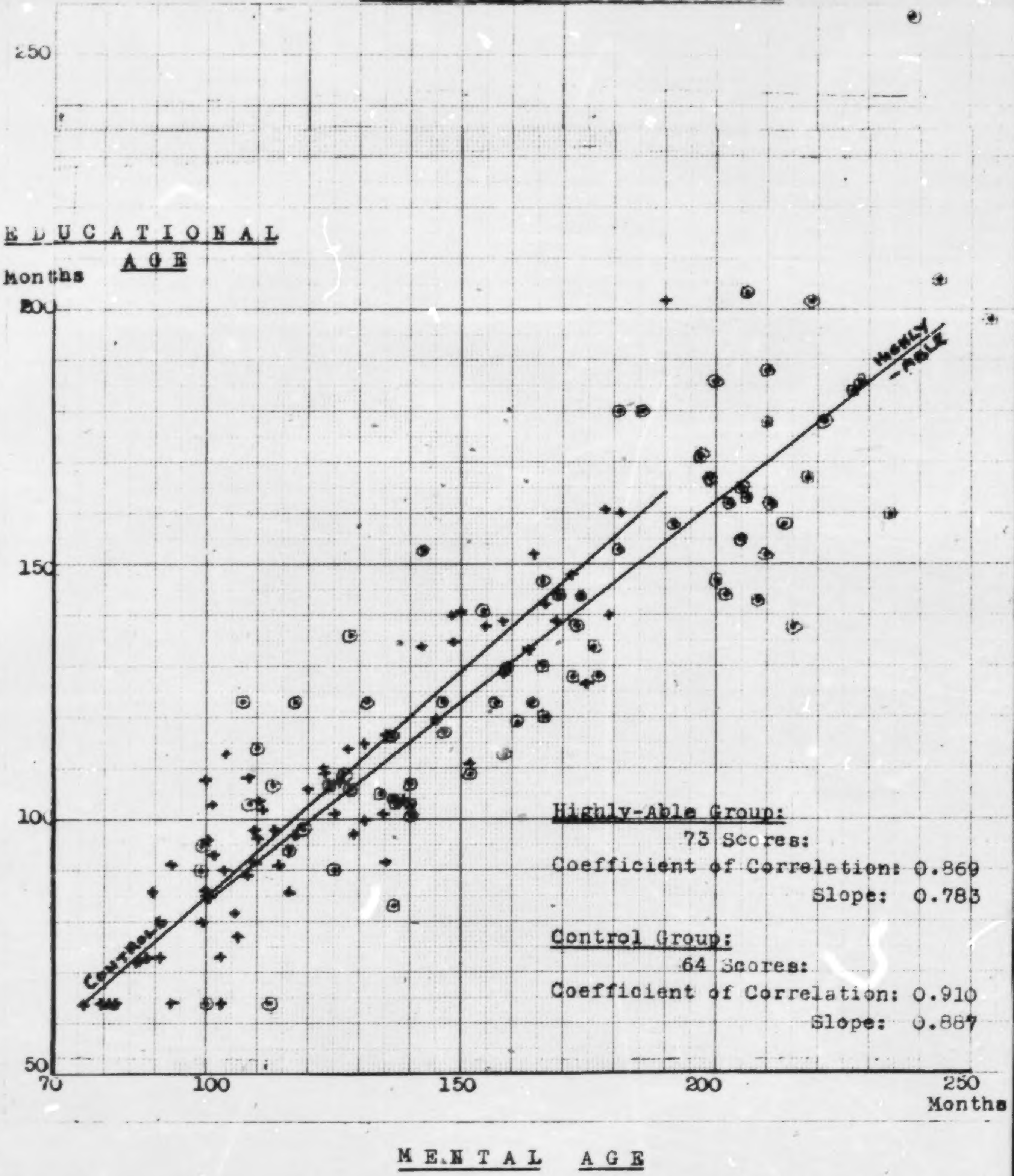
CHRONOLOGICAL AGE AND STANFORD BINET SCORE

IDENT NO.	CHRON. AGE	MENTAL AGE	IQ
1a	5yrs 7m	7yrs 0m	129
2a	5yrs 9m	7yrs 10m	102
3a	5yrs 10m	6yrs 9m	118
4a	7yrs 11m	9yrs 4m	116
5a	5yrs 8m	6yrs 4m	113
6a	6yrs 2m	7yrs 6m	124
7a	6yrs 10m	7yrs 2m	105
8a	6yrs 5m	8yrs 2m	130
9a	6yrs 4m	7yrs 8m	123
10a	None	None	None
11a	6yrs 10m	7yrs 10m	115
12a	7yrs 6m	8yrs 8m	115
13a	7yrs 3m	7yrs 4m	100
14a	7yrs 7m	8yrs 8m	113
15a	7yrs 3m	8yrs 8m	120
16a	6yrs 11m	8yrs 10m	129
17a	8yrs 1m	8yrs 10m	107
18a	9yrs 1m	10yrs 6m	113
19a	7yrs 6m	8yrs 0m	106
20a	7yrs 3m	8yrs 4m	115
21a	7yrs 0m	8yrs 4m	120
22a	8yrs 0m	9yrs 6m	117
23a	None	None	None
24a	7yrs 5m	8yrs 4m	112
25a	8yrs 4m	9yrs 10m	116
26a	7yrs 2m	9yrs 2m	129
27a	7yrs 9m	9yrs 8m	124
28a	7yrs 5m	9yrs 4m	126
29a	7yrs 4m	9yrs 2m	125
30a	7yrs 9m	8yrs 6m	108
31a	7yrs 9m	9yrs 0m	115
32a	7yrs 1m	8yrs 10m	125
33a	8yrs 11m	9yrs 2m	100
34a	8yrs 2m	10yrs 0m	121
35a	7yrs 6m	9yrs 8m	129
36a	8yrs 7m	10yrs 2m	116

IDENT NO.	CHRON. AGE	MENTAL AGE	IQ
37a	8yrs 5m	10yrs 8m	125
38a	None	None	None
39a	9yrs 8m	10yrs 8m	107
40a	None	None	None
41a	9yrs 5m	12yrs 8m	130
42a	None	None	None
43a	8yrs 0m	9yrs 3m	114
44a	8yrs 10m	11yrs 6m	127
45a	8yrs 11m	10yrs 4m	113
46a	9yrs 0m	10yrs 6m	114
47a	10yrs 7m	12yrs 8m	116
48a	8yrs 8m	11yrs 5m	129
49a	9yrs 1m	10yrs 4m	111
50a	10yrs 5m	13yrs 2m	122
51a	9yrs 7m	11yrs 0m	111
52a	9yrs 6m	11yrs 0m	113
53a	10yrs 8m	14yrs 5m	130
54a	10yrs 11m	11yrs 10m	106
55a	11yrs 6m	13yrs 8m	115
56a	10yrs 2m	13yrs 8m	130
57a	10yrs 0m	11yrs 4m	110
58a	10yrs 0m	8yrs 6m	83
59a	None	None	None
60a	11yrs 4m	15yrs 3m	129
61a	12yrs 1m	12yrs 6m	102
62a	11yrs 8m	12yrs 8m	106
63a	None	None	None
64a	10yrs 11m	13yrs 2m	117
65a	11yrs 4m	14yrs 0m	119
66a	11yrs 7m	9yrs 2m	80
67a	11yrs 0m	13yrs 10m	121
68a	None	None	None
69a	11yrs 6m	13yrs 4m	113
70a	11yrs 5m	13yrs 2m	112
71a	11yrs 3m	14yrs 10m	127
72a	11yrs 8m	14yrs 11m	123
73a	None	None	None

APPENDIX A

FIGURE A/3 REGRESSION LINES FOR MENTAL AGES AND ENGLISH EDUCATIONAL AGES FOR SAMPLE



Highly-Able Group:
73 Scores:
Coefficient of Correlation: 0.869
Slope: 0.783

Control Group:
64 Scores:
Coefficient of Correlation: 0.910
Slope: 0.887

APPENDEX B

TABLE B/1 READING ATTAINMENT TEST SCORES

PUPIL GROUP	N.F.E.R. ATTAINMENT TEST	CHILD'S IDENT. NO.	AGE IN MONTHS		ATT. TEST SCORE		EDUC. AGE MONTHS	EDUCATIONAL	
			CHRON.	MENTAL	RAW	STAND		RATIO EA/MA x 100	INDEX EA-MA MONTHS
Highly	Reading	1	67	121	33	136	111	91	-10
-Able	229A	6	68	94	20	121	92	97	-2
Main		2	70	112	13	115	86	76	-26
		5	72	125	28	125	101	80	-24
		7	72	99	1	86	66	66	-33
		3	72	110	33	133	111	100	+1
		11	79	110	34	129	114	103	+4
		15	84	134	32	120	109	81	-25
		16	84	128	34	124	114	89	-14
		23	84	137	35	127	119	86	-18
		20	85	131	36	130	124	94	-7
		21	86	123	37	134	130	105	+7
		9	74	107	14	112	87	81	-20
		24	89	128	38	140	147	114	+19
		28	90	137	23	104	95	69	-42
		13	83	119	25	112	97	81	-22
		10	78	117	9	104	82	70	-35
No. = 17			Mean= 79 s.d.= 7.56	Mean= 120 s.d.= 12.78	Mean= 26 s.d.= 11.14	Mean= 121 s.d.= 13.93	Mean= 105 s.d.= 19.81	Mean= 87 s.d.= 13.65	Mean= 15 = 1y 3m
Cont rol	Reading	1a	65	82	0	92	56	68	-26
	229A	3a	69	79	1	96	66	84	-13
Main		2a	71	72	0	87	56	78	-16
		6a	71	86	0	87	56	65	-30
		5a	72	80	0	86	56	70	-24
		9a	73	88	2	96	69	78	-19
		8a	69	100	34	129	115	115	+15
		11a	81	93	5	95	75	80	-18
		16a	85	109	32	119	109	100	0
		21a	85	102	10	98	83	81	-19
		15a	86	103	17	103	90	87	-13
		20a	86	99	0	73	56	56	-43
		28a	87	109	13	99	86	78	-23
		24a	89	100	18	101	91	91	-9
		13a	88	89	19	103	91	102	+2
		7a	83	87	4	92	74	85	-13
No. = 16			Mean= 79 s.d.= 8.34	Mean= 92 s.d.= 11.18	Mean= 10 s.d.= 11.45	Mean= 97 s.d.= 13.05	Mean= 77 s.d.= 19.23	Mean= 82 s.d.= 14.81	Mean= -16 = 1y 4m

TABLE B/2 **READING ATTAINMENT TEST SCORES**

PUPIL GROUP	N.F.E.R. ATTAINMENT TEST	CHILD'S IDENT. NO.	AGE IN MONTHS		ATT. TEST SCORE		EDUC. AGE MONTHS	EDUCATIONAL	
			CHRON.	MENTAL	RAW	STAND		RATIO $\frac{EA}{MA}$ x 100	INDEX EA-MA MONTHS
Highly -Able High IQ Sub- Group	Reading 229A	1 2 5 15 23	67 70 72 84 84	121 112 125 134 137	33 13 28 32 35	136 115 125 120 127	111 86 101 109 119	91 76 80 81 86	-10 -26 -24 -25 -18
No. = 5			Mean= 75 s.d.= 8.05	Mean= 126 s.d.= 10.09	Mean= 28 s.d.= 8.87	Mean= 125 s.d.= 7.89	Mean= 105 s.d.= 12.50	Mean= 83 s.d.= 5.81	Mean= -21 = 1y 9m
Control Low IQ Sub- Group	Reading 229A	3a 2a 5a 11a 21a 15a 20a 24a 13a 7a	69 71 72 81 85 86 86 89 88 83	79 76 80 93 102 103 99 100 89 87	1 0 0 5 10 17 0 18 19 4	96 87 87 95 98 103 73 101 103 92	66 56 56 75 83 90 56 91 91 74	83 73 70 80 81 87 56 91 102 85	-13 -20 -24 -18 -19 -13 -43 -9 +2 -13
No. = 10			Mean= 81 s.d.= 7.51	Mean= 91 s.d.= 10.13	Mean= 7.4 s.d.= 7.95	Mean= 94 s.d.= 9.27	Mean= 74 s.d.= 14.73	Mean= 81 s.d.= 12.53	Mean= -17 = 1y 5m

TABLE B/3 **ENGLISH ATTAINMENT TEST SCORES**

PUPIL GROUP	NFER ATTAIN-MENT TEST	CHILD'S IDENT. NO.	AGE IN MONTHS		ATT. TEST SCORE		EDUC. AGE MONTHS	EDUCATIONAL	
			CHRON.	MENTAL	RAW	STAND		RATIO $\frac{EA}{MA}$ x 100	INDEX EA-MA MONTHS
Highly	English	1	67	117	39	153	123	105	+6
-Able	Progress	2	70	112	0	88	64	57	-48
Main	A.2	7	72	99	5	112	95	95	-4
	159A	6	72	99	9	116	90	90	-9
		5	72	125	9	116	90	72	-35
		8	72	100	0	93	64	64	-36
		3	73	113	29	132	107	94	-6
		9	77	108	25	125	103	94	-5
		10	77	116	14	115	94	81	-22
		11	79	110	35	134	114	103	+4
		14	82	136	36	133	116	85	-20
		12	83	140	40	140	126	90	-14
		13	83	119	19	114	98	82	-21
		16	84	128	28	121	106	82	-22
		23	84	137	25	118	103	75	-34
		15	84	134	27	120	105	78	-29
		32	84	146	39	137	123	84	-23
		20	85	131	39	136	123	93	-8
		21	86	123	29	120	107	86	-16
		31	86	137	4	99	83	60	-54
		19	86	124	29	120	107	86	-17
		35	88	146	36	127	117	80	-29
		24	89	128	42	147	136	106	+8
		25	89	127	31	119	109	85	-18
		27	90	168	34	122	113	67	-55
		28	90	137	15	104	94	68	-43
		26	90	140	25	112	103	73	-37
		17	92	138	40	132	126	91	-12
		29	92	152	31	115	109	71	-43
		30	95	140	23	106	101	72	-39
		22	95	164	39	127	123	75	-41
		34	96	140	29	110	107	76	-33
		4	96	161	40	129	126	78	-35
		44	102	174	38	118	121	69	-53
No. = 34			Mean= 84 s.d.= 8.67	Mean= 131 s.d.= 19.08	Mean= 27 s.d.= 12.64	Mean= 121 s.d.= 14.14	Mean= 107 s.d.= 16.44	Mean= 81 s.d.= 12.27	Mean= -25 = 2y 1m

TABLE B/3 (Continued)

Control	English								
Main	Progress	1a	65	82	0	99	64	78	-18
	A.2	3a	70	81	0	94	64	79	-17
		2a	71	76	0	93	64	84	-12
	159A	5a	72	80	0	93	64	80	-16
		6a	75	91	1	98	73	80	-18
		9a	77	93	11	114	91	97	-2
		8a	79	100	30	128	108	108	+8
		32a	81	100	6	104	86	86	-14
		11a	81	93	0	84	64	68	-29
		19a	82	88	1	92	73	82	-15
		7a	83	88	1	91	73	82	-15
		21a	85	102	1	89	73	71	-29
		16a	85	109	20	113	98	89	-11
		27a	86	106	2	92	77	72	-29
		26a	86	129	18	110	97	88	-32
		20a	86	99	3	95	80	80	-19
		15a	86	103	0	80	64	62	-39
		28a	87	109	12	105	92	84	-17
		12a	88	102	13	105	93	91	-9
		29a	88	110	18	108	97	88	-13
		13a	88	89	6	99	86	103	-3
		24a	89	100	17	107	96	96	-4
		35a	90	116	6	97	86	74	-30
		14a	91	104	33	120	113	108	+9
		31a	93	108	8	96	89	82	-19
		30a	93	105	3	89	82	80	-23
		17a	95	103	10	96	90	87	-13
		4a	96	113	20	102	98	86	-15
		22a	96	114	11	96	91	79	-23
		34a	98	120	28	107	106	88	-14
		25a	100	118	18	97	97	85	-21
		44a	104	135	23	97	101	77	-34
No. = 32			Mean= 86 s.d.= 9.08	Mean= 102 s.d.= 13.86	Mean= 10 s.d.= 9.56	Mean= 100 s.d.= 10.20	Mean= 85 s.d.= 14.42	Mean= 84 s.d.= 10.36	Mean= 17 = 1y 5m

TABLE B/4 ENGLISH ATTAINMENT TEST SCORES

PUPIL GROUP	N.F.E.R. ATTAINMENT TEST	CHILD'S IDENT. NO.	AGE IN MONTHS		ATT. TEST SCORE		EDUC. AGE MONTHS	EDUCATIONAL	
			CHRON.	MENTAL	RAW	STAND		RATIO EA/MA x 100	INDEX EA-MA MONTHS
Highly -Able High IQ Sub- Group	English Progress A.2 159A	1	67	117	39	153	123	105	+6
		2	70	112	0	88	64	57	-48
		5	72	125	9	116	90	72	-35
		14	82	136	36	133	116	85	-20
		12	83	140	40	140	126	90	-14
		23	84	137	25	118	103	75	-34
		15	84	134	27	120	105	78	-29
		32	84	146	39	137	123	84	-23
		31	86	137	4	99	83	60	-54
		35	88	146	36	127	117	80	-29
		27	90	168	34	122	113	67	-55
		29	92	152	31	115	109	71	-43
		22	95	164	39	127	123	75	-41
		4	96	161	40	129	126	78	-35
		44	102	174	38	118	121	69	-53
No. = 15			Mean= 85 s.d.= 9.74	Mean= 143 s.d.= 18.17	Mean= 29 s.d.= 13.72	Mean= 123 s.d.= 15.87	Mean= 110 s.d.= 18.03	Mean= 76 s.d.= 11.93	Mean= -34 = 2y 10m
Control Low IQ Sub- Group	English Progress A.2 159A	3a	70	81	0	94	64	79	-17
		2a	71	76	0	93	64	84	-12
		5a	72	80	0	93	64	80	-16
		11a	81	93	0	84	64	68	-29
		19a	82	88	1	92	73	82	-15
		7a	83	88	1	91	73	82	-15
		21a	85	102	1	89	73	71	-29
		20a	86	99	3	95	80	80	-19
		15a	86	103	0	80	64	62	-39
		12a	88	102	13	105	93	91	-9
		13a	88	89	6	99	86	103	-3
		24a	89	100	17	107	96	96	-4
		14a	91	104	33	120	113	108	+9
		31a	93	108	8	96	89	82	-19
		30a	93	105	3	89	82	80	-23
		17a	95	103	10	96	90	87	-13
		4a	96	113	20	102	98	86	-15
		22a	96	114	11	96	91	79	-23
		25a	100	118	18	97	97	85	-21
No. = 19			Mean= 87 s.d.= 8.62	Mean= 98 s.d.= 11.91	Mean= 8 s.d.= 9.15	Mean= 96 s.d.= 8.77	Mean= 82 s.d.= 14.60	Mean= 83 s.d.= 10.95	Mean= 16 = 1y 4m

TABLE B/5 ENGLISH ATTAINMENT TEST SCORES

PUPIL GROUP	N.F.E.R. ATTAINMENT TEST	CHILD'S IDENT. NO.	AGE IN MONTHS		ATT. TEST SCORE		EDUC. AGE MONTHS	EDUCATIONAL	
			CHRON.	MENTAL	RAW	STAND		RATIO $\frac{EA}{MA}$ x 100	INDEX EA-MA MONTHS
Highly -Able Main	English Progress B.2	12	89	154	44	140	141	92	-13
		17	95	143	48	145	153	106	+10
		22	96	166	39	127	130	78	-36
		4	96	161	30	118	119	73	-42
		18	96	173	42	130	138	79	-35
		45	102	172	37	119	128	74	-44
		44	103	176	40	123	134	76	-42
		33	105	157	33	133	123	78	-34
		36	106	164	33	112	123	75	-41
		41	107	159	39	118	130	81	-29
		49	109	177	37	114	128	72	-49
		48	110	166	31	107	120	72	-46
		50	113	174	45	124	143	82	-31
		51	113	164	47	129	150	91	-14
		39	115	225	50	141	177	78	-48
		43	105	209	50	148	167	80	-42
		42	102	213	41	125	134	62	-79
No. = 17			Mean= 104 s.d.= 7.35	Mean= 174 s.d.= 21.99	Mean= 40 s.d.= 6.40	Mean= 127 s.d.= 11.80	Mean= 138 s.d.= 17.56	Mean= 79 s.d.= 9.77	Mean= -36 = 3y 0m
Control Main	English Progress B.2	48a	103	135	5	92	92	68	-43
		33a	105	108	19	103	108	100	0
		45a	106	123	21	103	110	89	-13
		36a	106	126	19	102	108	85	-18
		18a	108	125	10	94	101	80	-24
		49a	108	123	21	102	110	89	-13
		41a	113	151	22	99	111	73	-40
		39a	115	127	25	99	114	89	-13
		51a	115	131	27	100	115	87	-16
		50a	125	158	38	103	129	81	-29
		43a	96	111	12	104	102	91	-9
No. = 11			Mean= 109 s.d.= 7.65	Mean= 129 s.d.= 14.94	Mean= 20 s.d.= 8.92	Mean= 100 s.d.= 3.91	Mean= 109 s.d.= 9.33	Mean= 85 s.d.= 8.87	Mean= -20 = 1y 8m

TABLE B/6 ENGLISH ATTAINMENT TEST SCORES

PUPIL GROUP	N.F.E.R. ATTAINMENT TEST	CHILD'S IDENT. NO.	AGE IN MONTHS		ATT. TEST SCORE		EDUC. AGE MONTHS	EDUCATIONAL	
			CHRON.	MENTAL	RAW	STAND		RATIO $\frac{EA}{MA}$ x 100	INDEX EA - MA MONTHS
Highly -Able High IQ Sub-Group	English Progress B.2	12	89	154	44	140	141	92	-13
		22	96	166	39	127	130	78	-36
		4	96	161	30	118	119	73	-42
		18	96	173	42	130	138	79	-35
		45	102	172	37	119	128	74	-44
		44	103	176	40	123	134	76	-42
		39	115	225	50	141	177	78	-48
		43	105	209	50	148	167	80	-42
		42	102	213	41	125	134	62	-79
No. = 9			Mean= 100 s.d.= 7.37	Mean= 183 s.d.= 25.55	Mean= 41 s.d.= 6.25	Mean= 130 s.d.= 10.57	Mean= 142 s.d.= 20.91	Mean= 77 s.d.= 7.92	Mean= 42 = 3y 6m
Control Low IQ Sub-Group	English Progress B.2	33a	105	108	19	103	108	100	0
		45a	106	123	21	103	110	89	-13
		36a	106	126	19	102	108	85	-18
		18a	108	125	10	94	101	80	-24
		49a	108	123	21	102	110	89	-13
		39a	115	127	25	99	114	89	-13
		51a	115	131	27	100	115	87	-16
		43a	96	111	12	104	102	91	-9
No. = 8			Mean= 107 s.d.= 6.05	Mean= 122 s.d.= 8.01	Mean= 19 s.d.= 5.83	Mean= 101 s.d.= 3.23	Mean= 109 s.d.= 5.01	Mean= 89 s.d.= 5.68	Mean= -13 = 1y 1m

TABLE B/7 ENGLISH ATTAINMENT TEST SCORES

PUPIL GROUP	N.F.E.R. ATTAINMENT TEST	CHILD'S IDENT. NO.	AGE IN MONTHS		ATT. TEST SCORE		EDUC. AGE MONTHS	EDUCATIONAL	
			CHRON.	MENTAL	RAW	STAND		RATIO EA/MA x 100	INDEX EA-MA MONTHS
Highly -Able Main	English Progress C.2	37	106	182	51	132	158	86	-24
		54	111	169	44	120	144	85	-25
		52	113	200	46	122	147	73	-53
		51	114	166	47	122	147	88	-19
		39	116	227	58	143	184	81	-43
		57	117	185	57	138	180	97	-5
		47	119	178	56	134	175	98	-3
		58	121	181	50	121	153	84	-28
		56	121	212	58	140	184	86	-28
		40	115	202	44	118	144	71	-58
		38	114	210	49	125	152	72	-58
		42	103	215	40	122	138	64	-77
		43	107	213	51	131	158	74	-55
No. = 13			Mean= 114 s.d.= 5.62	Mean= 195 s.d.= 19.59	Mean= 50 s.d.= 5.87	Mean= 128 s.d.= 8.50	Mean= 159 s.d.= 16.36	Mean= 139 s.d.= 10.20	Mean= 37 = 3y 1m
Control Main	English Progress C.2	37a	106	135	21	107	117	86	-18
		52a	113	131	7	92	100	76	-31
		46a	117	138	26	103	122	88	-16
		58a	118	101	9	91	103	101	+2
		56a	122	164	49	119	152	92	-12
		47a	123	148	39	108	135	91	-13
		57a	125	142	37	106	134	94	-8
		54a	136	148	42	102	140	94	-8
No. = 8			Mean= 120 s.d.= 3.14	Mean= 138 s.d.= 6.43	Mean= 29 s.d.= 5.49	Mean= 104 s.d.= 3.19	Mean= 125 s.d.= 6.43	Mean= 90 s.d.= 2.58	Mean= -13 = 1y 1m

TABLE B/8 ENGLISH ATTAINMENT TEST SCORES

PUPIL GROUP	N.F.E.R. ATTAINMENT TEST	CHILD'S IDENT. NO.	AGE IN MONTHS		ATT. TEST SCORE		EDUC. AGE MONTHS	EDUCATIONAL	
			CHRON.	MENTAL	RAW	STAND		RATIO $\frac{EA}{MA}$ x 100	INDEX EA-MA MONTHS
Highly -Able High IQ Sub-Group	English Progress C.2	37	106	182	51	132	158	86	-24
		52	113	200	46	122	147	73	-53
		39	116	227	58	143	184	81	-43
		56	121	212	58	140	184	86	-28
		40	115	202	44	118	144	71	-58
		38	114	210	49	125	152	72	-58
		42	103	215	40	122	138	64	-77
		43	107	213	51	131	158	74	-55
No. = 8			Mean= 112 s.d.= 6.01	Mean= 208 s.d.= 13.26	Mean= 50 s.d.= 6.35	Mean= 129 s.d.= 8.98	Mean= 158 s.d.= 17.34	Mean= 76 s.d.= 7.77	Mean= -50 = -4y 2m
Control Low IQ Sub-Group	English Progress C.2	52a	113	131	7	92	100	76	-31
		46a	117	138	26	103	122	88	-16
		58a	118	101	9	91	103	101	+2
		47a	123	148	39	108	135	91	-13
		57a	125	142	37	106	134	94	-8
		54a	136	148	42	102	140	94	-8
No. = 6			Mean= 122 s.d.= 8.10	Mean= 135 s.d.= 17.71	Mean= 27 s.d.= 15.45	Mean= 100 s.d.= 7.17	Mean= 122 s.d.= 17.21	Mean= 91 s.d.= 8.38	Mean= -12 = -1y 0m

TABLE B/9 **ENGLISH ATTAINMENT TEST SCORES**

PUPIL GROUP	N.F.E.R. ATTAINMENT TEST	CHILD'S IDENT. NO.	AGE IN MONTHS		ATT. TEST SCORE		EDUC. AGE MONTHS	EDUCATIONAL	
			CHRON.	MENTAL	RAW	STAND		RATIO $\frac{EA}{MA}$ x 100	INDEX EA-MA MONTHS
Highly -Able Main	English Progress D.2	46	107	234	53	127	160	68	-74
		56	119	208	42	113	143	69	-65
		61	122	210	64	131	178	85	-32
		55	125	218	59	124	167	77	-51
		53	127	206	71	140	203	99	-3
		66	131	222	64	126	178	80	-44
		64	132	203	56	117	162	80	-41
		62	132	200	66	128	186	93	-14
		65	133	199	59	119	167	84	-32
		67	134	254	61	120	171	67	-83
		60	135	211	48	108	152	72	-59
		68	137	205	51	110	155	76	-50
		70	138	219	74	145	230	105	+11
		69	138	210	67	126	188	90	-22
		72	139	228	66	124	186	82	-42
		59	126	228	69	136	198	87	-30
		47	121	181	65	133	180	99	-1
		73	133	196	66	128	186	95	-10
		63	130	197	61	123	171	87	-26
No. = 19			Mean= 129 s.d.= 8.3	Mean= 213 s.d.= 16.5	Mean= 61 s.d.= 8.4	Mean= 125 s.d.= 9.9	Mean= 177 s.d.= 20.7	Mean= 84 s.d.= 11.4	Mean= 35 = 2y 11m
Control Main	English Progress D.2	46a	117	138	11	107	104	75	-34
		53a	127	174	28	100	127	73	-47
		69a	133	155	37	102	138	89	-17
		60a	135	181	53	112	160	88	-21
		65a	135	166	41	104	142	86	-24
		55a	137	163	33	98	133	81	-30
		70a	137	158	39	101	139	88	-19
		62a	139	150	40	101	141	94	-9
		66a	139	110	9	81	104	95	-6
		72a	139	178	55	112	161	90	-17
		61a	140	145	22	90	120	83	-25
		64a	142	172	46	103	148	86	-24
		67a	143	179	39	98	140	78	-39
No. = 13			Mean= 136 s.d.= 6.96	Mean= 159 s.d.= 20.08	Mean= 35 s.d.= 14.19	Mean= 101 s.d.= 8.32	Mean= 135 s.d.= 17.84	Mean= 85 s.d.= 6.80	Mean= -24 = 2y 0m

TABLE B/10 ENGLISH ATTAINMENT TEST SCORES

PUPIL GROUP	N.F.E.R. ATTAINMENT TEST	CHILD'S IDENT. NO.	AGE IN MONTHS		ATT. TEST SCORE		EDUC. AGE MONTHS	EDUCATIONAL	
			CHRON.	MENTAL	RAW	STAND		RATIO EA/MA x 100	INDEX EA-MA MONTHS
Highly -Able High IQ Sub-Group	English Progress D.2	46	107	234	53	127	160	68	-74
		56	119	208	42	113	143	69	-65
		61	122	210	64	131	178	85	-32
		55	125	218	59	124	167	77	-51
		66	131	222	64	126	178	80	-44
		67	134	254	61	120	171	67	-83
		59	126	228	69	136	198	87	-30
No. = 7			Mean= 123 s.d.= 8.85	Mean= 225 s.d.= 15.83	Mean= 59 s.d.= 8.93	Mean= 125 s.d.= 7.43	Mean= 171 s.d.= 17.07	Mean= 76 s.d.= 8.03	Mean= -54 = 4y 6m
Control Low IQ Sub-Group	English Progress D.2	46a	117	138	11	107	104	75	-34
		69a	133	155	37	102	138	89	-17
		65a	135	166	41	104	142	86	-24
		55a	137	163	33	98	133	81	-30
		70a	137	158	39	101	139	88	-19
		62a	139	150	40	101	141	94	-9
		66a	139	110	9	81	104	95	-6
		61a	140	145	22	90	120	83	-25
		64a	142	172	46	103	148	86	-24
No. = 9			Mean= 135 s.d.= 7	Mean= 151 s.d.= 17.52	Mean= 31 s.d.= 12.80	Mean= 99 s.d.= 7.65	Mean= 130 s.d.= 15.62	Mean= 86 s.d.= 5.89	Mean= -21 = -1y 9m
Highly -Able	English Progress E.2	59	132	239	67	154	258	107	+19
		67	134	254	56	127	198	77	-56
		71	146	219	57	124	202	92	-17
		73	139	205	46	111	165	80	-40
No. = 4			Mean= 138 s.d.= 5.40	Mean= 229 s.d.= 18.71	Mean= 57 s.d.= 7.43	Mean= 129 s.d.= 15.64	Mean= 206 s.d.= 33.41	Mean= 89 s.d.= 11.80	Mean= -24 = -2y 0m
Control No. = 1	English Progress E.2	71a	144	190	57	125	202	106	+12 = +1y 0m
Highly -Able No. = 1	English Progress F.3	70	154	244	45	115	206	84	-38 = -3y 2m

TABLE B/11 **MATHEMATICAL ATTAINMENT TEST SCORES**

PUPIL GROUP	N.F.E.R. ATTAINMENT TEST	CHILD'S IDENT. NO.	AGE IN MONTHS		ATT. TEST SCORE		EDUC. AGE MONTHS	EDUCATIONAL	
			CHRON.	MENTAL	RAW	STAND		RATIO $\frac{EA}{MA}$ x 100	INDEX EA-MA MONTHS
Highly -Able Main	Basic Maths 'A' (Oral)	6	68	93	19	120	81	87	-12
		8	72	99	16	107	76	77	-23
		1	67	117	31	148	98	84	-19
		2	70	112	22	110	76	68	-36
		3	72	110	34	148	103	94	-7
		11	78	108	31	131	99	92	-9
		4	94	157	40	127	111	71	-46
		9	73	105	13	98	72	69	-33
		10	78	117	21	109	84	72	-33
		13	83	119	25	110	89	75	-30
		5	72	120	22	120	85	71	-35
		16	84	128	29	118	95	74	-33
		21	85	121	33	125	101	84	-20
		19	86	124	23	109	87	70	-37
		17	94	141	35	116	104	74	-37
		25	89	127	31	114	98	77	-29
		24	90	130	34	120	103	79	-27
		15	84	134	28	115	94	70	-40
		20	85	130	35	130	104	80	-26
		12	83	140	32	126	100	71	-40
		30	94	142	33	111	101	71	-41
		14	82	136	29	121	96	71	-40
		28	90	137	37	126	107	78	-30
		26	90	140	36	124	106	76	-34
		22	95	164	37	119	107	65	-57
		29	94	154	32	109	100	65	-54
		31	86	137	28	112	94	69	-43
		27	90	168	30	110	97	58	-71
		35	88	142	38	132	109	77	-33
		32	86	166	40	140	111	67	-55
		23	84	137	35	131	104	76	-33
		7	71	98	25	129	90	92	-8
No. = 32			Mean= 83 s.d.= 8.48	Mean= 130 s.d.= 19.58	Mean= 30 s.d.= 6.86	Mean= 121 s.d.= 11.67	Mean= 96 s.d.= 10.46	Mean= 75 s.d.= 8.28	Mean= -34 = 2y 10m

TABLE B/11 (Continued)

Control Main	Basic Maths 'A' (Oral)	2a	71	72	5	83	60	83	-12
		3a	68	79	4	85	59	75	-20
		1a	66	83	11	105	69	83	-14
		13a	88	88	24	100	88	100	0
		6a	71	86	8	90	65	76	-21
		14a	92	105	30	107	97	92	-8
		9a	73	88	9	89	66	75	-22
		5a	71	79	4	81	59	75	-20
		11a	74	84	11	92	69	82	-15
		19a	95	102	17	73	78	77	-24
		21a	82	98	24	109	88	90	-10
		8a	78	98	25	118	89	91	-9
		20a	86	99	26	108	91	92	-8
		24a	89	100	23	96	87	87	-13
		30a	92	99	17	78	78	79	-21
		12a	90	104	22	92	85	82	-19
		15a	86	103	24	103	88	85	-15
		32a	84	104	18	92	79	76	-25
		17a	96	105	20	79	82	78	-23
		16a	84	107	29	118	96	90	-11
		31a	95	111	24	89	88	79	-23
		26a	86	110	33	124	101	92	-9
		29a	88	110	23	98	87	79	-23
		28a	87	109	26	106	91	84	-18
		4a	95	112	31	105	99	88	-13
		22a	97	115	33	107	101	88	-14
		27a	86	106	11	74	69	65	-37
		35a	90	116	18	83	79	76	-37
		25a	101	119	18	66	79	66	-40
		7a	83	87	16	89	76	87	-41
No. = 30			Mean= 85 s.d.= 9.43	Mean= 99 s.d.= 12.35	Mean= 20 s.d.= 8.52	Mean= 95 s.d.= 14.41	Mean= 81 s.d.= 12.49	Mean= 82 s.d.= 7.95	Mean= 18 = 1y 6m

TABLE B/12 MATHEMATICAL ATTAINMENT TEST SCORES

PUPIL GROUP	N.F.E.R. ATTAIN-MENT TEST	CHILD'S IDENT. NO.	AGE IN MONTHS		ATT. TEST SCORE		EDUC. AGE MONTHS	EDUCATIONAL	
			CHRON.	MENTAL	RAW	STAND		RATIO $\frac{EA}{MA} \times 100$	INDEX EA-MA MONTHS
Highly -Able High IQ Sub-Group	Basic Maths 'A' (Oral)	1	67	117	31	148	98	84	-19
		2	70	112	22	110	76	68	-36
		4	94	157	40	127	111	71	-46
		5	72	120	22	120	85	71	-35
		15	84	134	28	115	94	70	-40
		12	83	140	32	126	100	71	-40
		14	82	136	29	121	96	71	-40
		22	95	164	37	119	107	65	-57
		29	94	154	32	109	100	65	-54
		31	86	137	28	112	94	69	-43
		27	90	168	30	110	97	58	-71
		35	88	142	38	132	109	77	-33
		32	86	166	40	140	111	67	-55
		23	84	137	35	131	104	76	-33
No. = 14			Mean= 84 s.d.= 8.84	Mean= 142 s.d.= 18.12	Mean= 32 s.d.= 5.84	Mean= 123 s.d.= 11.87	Mean= 99 s.d.= 9.87	Mean= 70 s.d.= 6.15	Mean= -43 = -3y 7m
Control Low IQ Sub-Group	Basic Maths 'A' (Oral)	2a	71	72	5	83	60	83	-12
		3a	68	79	4	85	59	75	-20
		13a	88	88	24	100	88	100	0
		14a	92	105	30	107	97	92	-8
		5a	71	79	4	81	59	75	-20
		11a	74	84	11	92	69	82	-15
		19a	95	102	17	73	78	77	-24
		20a	86	99	26	108	91	92	-8
		24a	89	100	23	96	87	87	-13
		30a	92	99	17	78	78	79	-21
		12a	90	104	22	92	85	82	-19
		15a	86	103	24	103	88	85	-15
		17a	96	105	20	79	82	78	-23
		31a	95	111	24	89	88	79	-23
		4a	95	112	31	105	99	88	-13
		22a	97	115	33	107	101	88	-14
		25a	101	119	18	66	79	66	-40
		21a	82	98	24	109	88	90	-10
		7a	83	87	16	89	76	87	-11
No. = 19			Mean= 87 s.d.= 9.77	Mean= 98 s.d.= 13.10	Mean= 20 s.d.= 8.68	Mean= 92 s.d.= 12.98	Mean= 82 s.d.= 12.74	Mean= 83 s.d.= 7.80	Mean= -16 = -1y 4m

TABLE B/13 MATHEMATICAL ATTAINMENT TEST SCORES

PUPIL GROUP	N.F.E.R. ATTAINMENT TEST	CHILD'S IDENT. NO.	AGE IN MONTHS		ATT. TEST SCORE		EDUC. AGE MONTHS	EDUCATIONAL	
			CHRON.	MENTAL	RAW	STAND		RATIO $\frac{EA}{MA}$ x 100	INDEX EA-MA MONTHS
Highly -Able Main	Basic Maths 'B' (Oral)	32	87	150	39	149	160	107	+10
		28	90	136	37	136	150	110	+14
		14	91	154	26	110	106	69	-48
		4	95	159	34	124	132	83	-27
		31	95	154	33	121	130	84	-24
		22	96	166	35	127	136	82	-30
		34	97	146	25	104	104	71	-42
		25	98	142	32	117	124	87	-18
		35	99	168	38	136	153	91	-15
		44	102	174	33	117	130	75	-44
		36	105	163	38	131	153	94	-10
		41	107	159	35	119	136	86	-23
No. = 12			Mean= 97 s.d.= 5.94	Mean= 156 s.d.= 11.18	Mean= 34 s.d.= 4.45	Mean= 124 s.d.= 12.43	Mean= 135 s.d.= 17.78	Mean= 87 s.d.= 12.74	Mean= -21 = -1y 9m
Control Main	Basic Maths 'B' (Oral)	14a	92	105	24	106	101	96	-4
		31a	95	111	15	91	82	74	-29
		4a	96	113	24	104	101	89	-12
		22a	97	115	25	104	104	90	-11
		34a	98	120	21	97	94	78	-26
		41a	100	132	27	106	109	83	-23
		25a	102	121	28	106	112	93	-9
		35a	102	134	25	101	104	78	-30
		44a	104	135	33	116	130	96	-5
		36a	106	126	32	112	124	98	-2
No. = 10			Mean= 99 s.d.= 4.37	Mean= 121 s.d.= 10.39	Mean= 25 s.d.= 5.19	Mean= 104 s.d.= 7.04	Mean= 106 s.d.= 13.84	Mean= 88 s.d.= 8.67	Mean= -15 = -1y 3m

TABLE B/14 MATHEMATICAL ATTAINMENT TEST SCORES

PUPIL GROUP	N.F.E.R. ATTAINMENT TEST	CHILD'S IDENT. NO.	AGE IN MONTHS		ATT. TEST SCORE		EDUC. AGE MONTHS	EDUCATIONAL	
			CHRON.	MENTAL	RAW	STAND		RATIO $\frac{EA}{MA}$ x 100	INDEX EA-MA MONTHS
Highly-Able High IQ Sub-Group	Basic Maths 'B' (Oral)	32	87	150	39	149	160	107	+10
		14	91	154	26	110	106	69	-48
		4	95	159	34	124	132	83	-27
		31	95	154	33	121	130	84	-24
		22	96	166	35	127	136	82	-30
		35	99	168	38	136	153	91	-15
		44	102	174	33	117	130	75	-44
No. = 7			Mean= 95 s.d.= 4.93	Mean= 161 s.d.= 8.81	Mean= 34 s.d.= 4.24	Mean= 126 s.d.= 12.88	Mean= 135 s.d.= 17.56	Mean= 84 s.d.= 12.16	Mean= -25 = -2y 1m
Control Low IQ Sub-Group	Basic Maths 'B' (Oral)	14a	92	105	24	106	101	96	-4
		31a	95	111	15	91	82	74	-29
		4a	96	113	24	104	101	89	-12
		22a	97	115	25	104	104	90	-11
		25a	102	121	28	106	112	93	-9
		36a	106	126	32	112	124	98	-2
No. = 6			Mean= 98 s.d.= 5.10	Mean= 115 s.d.= 7.44	Mean= 25 s.d.= 5.65	Mean= 104 s.d.= 6.94	Mean= 104 s.d.= 13.90	Mean= 90 s.d.= 8.56	Mean= -11 = -0y 11m

TABLE B/15 MATHEMATICAL ATTAINMENT TEST SCORES

PUPIL GROUP	N.F.E.R. ATTAINMENT TEST	CHILD'S IDENT. NO.	AGE IN MONTHS		ATT. TEST SCORE		EDUC. AGE MONTHS	EDUCATIONAL	
			CHRON.	MENTAL	RAW	STAND		RATIO $\frac{EA}{MA}$ x 100	INDEX EA-MA MONTHS
Highly -Able Main	Basic Maths 'C'	32	92	100	41	121	154	96	-6
		18	97	175	39	116	145	83	-30
		45	105	178	40	115	148	83	-30
		36	106	164	37	112	135	82	-29
		37	106	184	40	116	145	79	-39
		33	108	163	33	105	123	75	-40
		49	110	178	39	112	145	81	-33
		48	112	169	45	122	178	105	+9
		51	113	164	34	107	125	76	-39
		52	113	200	42	116	160	87	-40
		50	114	175	45	121	178	102	+3
		39	115	225	49	134	185	82	-40
		47	119	178	48	129	156	88	-22
		56	121	212	47	124	162	76	-50
		57	126	202	48	125	167	83	-35
		58	124	186	41	110	140	75	-46
		35	100	170	45	127	178	105	+8
		40	113	195	48	130	202	104	+7
		38	112	204	47	127	193	95	-11
		42	102	213	37	113	135	63	-78
		43	105	209	45	124	178	98	-31
No. = 21			Mean= 110 s.d.= 8.58	Mean= 186 s.d.= 19.32	Mean= 42 s.d.= 4.81	Mean= 119 s.d.= 7.98	Mean= 159 s.d.= 22.25	Mean= 87 s.d.= 11.68	Mean= -27 = -2y 3m
Control Main	Basic Maths 'C'	48a	105	138	10	84	65	47	-73
		37a	106	135	21	94	88	65	-47
		33a	108	111	7	77	40	36	-71
		18a	108	125	29	101	113	90	-12
		45a	109	126	21	93	88	70	-38
		49a	110	125	21	93	88	70	-37
		52a	113	131	21	92	88	67	-43
		51a	115	131	25	97	110	84	-21
		39a	116	128	28	97	110	86	-18
		58a	121	102	16	84	95	93	-7
		56a	122	165	42	113	144	87	-21
		47a	123	148	43	114	147	99	-1
		57a	125	142	25	91	110	77	-32
		50a	125	158	41	110	154	97	-4
		54a	136	148	30	96	115	78	-33
		35a	103	133	15	89	70	53	-63
		43a	96	111	19	95	82	74	-29
No. = 19			Mean= 114 s.d.= 10.09	Mean= 133 s.d.= 16.48	Mean= 24 s.d.= 10.43	Mean= 95 s.d.= 9.97	Mean= 100 s.d.= 30.00	Mean= 75 s.d.= 17.63	Mean= -32 = -2y 8m

TABLE B/16 MATHEMATICAL ATTAINMENT TEST SCORES

PUPIL GROUP	N.F.E.R. ATTAINMENT TEST	CHILD'S IDENT. NO.	AGE IN MONTHS		ATT. TEST SCORE		EDUC. AGE MONTHS	EDUCATIONAL	
			CHRON.	MENTAL	RAW	STAND		RATIO EA/MA x 100	INDEX EA-MA MONTHS
Highly	**Basic**	32	92	160	41	121	154	96	-6
-Able	**Maths**	18	97	175	39	116	145	83	-30
High IQ	**'C'**	45	105	178	40	115	148	83	-30
Sub-		37	106	184	40	116	145	79	-39
Group		52	113	200	42	116	160	87	-40
		39	115	225	49	134	185	82	-40
		56	211	212	47	124	162	76	-50
		35	100	170	45	127	178	105	+8
		40	113	195	48	130	202	104	+7
		38	112	204	47	127	193	95	-11
		42	102	213	37	113	135	63	-78
		43	105	209	45	124	178	98	-31
No. - 12			Mean- 107 s.d.- 8.34	Mean- 194 s.d.- 20.13	Mean- 43 s.d.- 3.99	Mean- 122 s.d.- 6.78	Mean- 165 s.d.- 21.39	Mean- 88 s.d.- 12.41	Mean- -28 - -2y 4m
Control	**Basic**	33a	108	111	7	77	40	36	-71
Low IQ	**Maths**	18a	108	125	29	101	113	90	-12
Sub-	**'C'**	45a	109	126	21	93	88	70	-38
Group		49a	110	125	21	93	88	70	-37
		52a	113	131	21	92	88	67	-43
		51a	115	131	25	97	110	84	-21
		39a	116	128	28	97	110	86	-18
		58a	121	102	16	84	95	93	-7
		47a	123	148	43	114	147	99	-1
		57a	125	142	25	91	110	77	-32
		54a	136	148	30	96	115	78	-33
		43a	96	111	19	95	82	74	-29
No. - 12			Mean- 115 s.d.- 10.30	Mean- 127 s.d.- 14.41	Mean- 24 s.d.- 8.76	Mean- 94 s.d.- 8.92	Mean- 99 s.d.- 25.70	Mean- 86 s.d.- 16.32	Mean- -28 - -2y 4m

TABLE B/17 MATHEMATICAL ATTAINMENT TEST SCORES

PUPIL GROUP	N.F.E.R. ATTAINMENT	CHILD'S IDENT. NO.	AGE IN MONTHS		ATT. TEST SCORE		EDUC. AGE MONTHS	EDUCATIONAL	
			CHRON.	MENTAL	RAW	STAND		RATIO $\frac{EA}{MA} \times 100$	INDEX EA-MA MONTHS
Highly	Basic	46	108	234	51	139	206	88	-28
-Able	Maths	50	115	117	40	119	164	93	-13
Main	'DE'	39	116	227	45	125	179	79	-48
		47	119	178	38	116	159	89	-19
		56	121	212	40	117	167	77	-45
		61	122	210	48	128	191	91	-19
		55	125	218	54	142	225	103	+7
		53	126	204	52	134	211	103	+7
		57	126	202	45	121	179	89	-23
		66	131	222	49	126	196	88	-26
		64	132	203	39	112	161	79	-42
		62	132	198	48	124	191	96	-7
		65	133	198	46	120	184	92	-14
		67	134	255	52	131	211	83	-43
		60	135	211	38	109	159	75	-52
		68	136	204	36	107	154	75	-50
		69	137	209	54	137	225	108	+16
		70	138	219	55	142	234	107	+15
		72	139	228	50	124	201	88	-27
		59	126	228	51	132	206	90	-22
		40	115	202	35	114	151	75	-51
		38	114	210	48	131	191	91	-19
		73	133	196	38	110	159	81	-37
		43	107	213	43	127	174	83	-39
		63	130	197	42	116	169	86	-28
No. = 25			Mean= 126 s.d.= 9.47	Mean= 210 s.d.= 16.79	Mean= 46 s.d.= 6.20	Mean= 124 s.d.= 10.24	Mean= 186 s.d.= 24.36	Mean= 88 s.d.= 9.64	Mean= -24 = -2y 0m
Control	Basic	46a	117	135	14	93	98	71	-37
Main	Maths	53a	126	170	31	106	141	83	-29
	'DE'	64a	131	158	26	99	130	82	-28
		67a	131	164	44	118	176	107	+12
		69a	133	155	34	106	149	96	-6
		65a	135	166	22	94	122	73	-44
		60a	135	181	47	121	186	103	+5
		55a	137	163	24	95	124	76	-39
		70a	137	158	37	108	156	99	-2
		62a	139	150	20	90	113	75	-37
		72a	139	178	40	110	164	92	-14
		61a	140	145	20	90	113	78	-32
		66a	140	111	5	70	66	59	-45
		47a	125	150	34	109	149	99	-1
No. = 14			Mean= 133 s.d.= 6.72	Mean= 156 s.d.= 17.94	Mean= 28 s.d.= 11.86	Mean= 101 s.d.= 13.26	Mean= 135 s.d.= 32.11	Mean= 85 s.d.= 14.22	Mean= -21 = -1y 9m

TABLE B/18 MATHEMATICAL ATTAINMENT TEST SCORES

PUPIL GROUP	N.F.E.R. ATTAINMENT TEST	CHILD'S IDENT. NO.	AGE IN MONTHS		ATT. TEST SCORE		EDUC. AGE MONTHS	EDUCATIONAL	
			CHRON.	MENTAL	RAW	STAND		RATIO $\frac{EA}{MA} \times 100$	INDEX EA-MA MONTHS
Highly-Able Sub-Group	Basic Maths 'DE'	46	108	234	51	139	206	88	-28
		39	116	227	45	125	179	79	-48
		56	121	212	40	117	167	77	-45
		61	122	210	48	128	191	91	-19
		55	125	218	54	142	225	103	+7
		66	131	222	49	126	196	88	-26
		67	134	254	52	131	211	83	-43
		59	126	228	51	132	206	90	-22
		40	115	202	35	114	151	75	-51
		38	114	210	48	131	191	91	-19
		43	107	213	43	127	174	83	-39
No. = 11			Mean= 120 s.d.= 8.79	Mean= 221 s.d.= 14.50	Mean= 47 s.d.= 5.70	Mean= 128 s.d.= 8.25	Mean= 191 s.d.= 21.54	Mean= 86 s.d.= 7.95	Mean= -30 = -2y 6m
Control Low IQ Sub-Group	Basic Maths 'DE'	46a	117	138	14	93	99	71	-39
		64a	131	158	26	99	130	82	-28
		69a	133	155	34	106	149	96	-6
		65a	135	166	22	94	122	73	-44
		55a	137	163	24	95	124	76	-39
		70a	137	158	37	108	156	99	-2
		62a	139	150	20	90	113	75	-37
		61a	140	145	20	90	113	78	-32
		66a	140	111	5	70	66	59	-45
		47a	125	150	34	109	149	99	-1
No. = 10			Mean= 133 s.d.= 7.40	Mean= 149 s.d.= 15.86	Mean= 24 s.d.= 9.82	Mean= 95 s.d.= 11.45	Mean= 122 s.d.= 26.89	Mean= 81 s.d.= 13.30	Mean= -27 = -2y 3m

TABLE B/18 (Continued)

Highly -Able	Basic Maths 'FG'	61	130	225	35	120	170	75	-55
		55	131	230	43	128	184	80	-46
		59	131	240	49	138	206	85	-34
		53	127	206	42	126	188	91	-18
		67	134	255	47	133	198	77	-57
		70	145	231	52	140	226	97	-5
		71	146	219	45	124	192	87	-27
		46	107	234	46	144	194	82	-40
		69	143	218	52	142	226	103	+8
		73	139	205	32	119	164	80	-41
No. = 10			Mean= 133 s.d.= 10.85	Mean= 226 s.d.= 14.48	Mean= 44 s.d.= 6.29	Mean= 131 s.d.= 8.78	Mean= 195 s.d.= 19.54	Mean= 86 s.d.= 8.52	Mean= -32 = -2y 8m
Control	Basic Maths 'FG'	71a	144	190	43	122	186	97	-4
		46a	117	138	6	99	155	83	-23
No. = 2			Mean= 131	Mean= 164	Mean= 25	Mean= 111	Mean= 151	Mean= 90	Mean= -14 = -1y 2m

APPENDIX C

TABLE C/1 TEACHERS' COMMENTS ON SAMPLE CHILDREN

(Lines commenced with a capital letter refer to a separate child).

HIGHLY-ABLE GROUP	CONTROL GROUP
1. Physical Disadvantages and Circumstances	
Adopted Spastic Asthma - small for his age Poor hand control Only child Rheumatic Fever but physical and social development unhindered. Attractive but too tall and over-developed for age	Diabetic A slight hesitation of speech Left-handed Twin brother in parallel class Twin sister in parallel class
2. General Personality Characteristics and Adjustment	
A precocious child Appears to be aware he is capable and airs his knowledge Courteous and helpful An individualist and self-centred Inclined to bully those less able, but helps those who need it. Reluctant to ask for help - is rather nervous. Plays normally. Independent and reliable Even-tempered and reliable Cannot compromise, aggressive if thwarted - home problems - eager to be liked An individualist with good sense of humour - sophisticated but not precocious Pleasant and helpful Unassuming, appears unaware of his good ability - very likeable Appears to be well-adjusted now Sensitive and retiring but not withdrawn - seems happy at school Very quiet disposition Lives in his own world Nervous Worried and needs constant reassurance - finds it difficult to get down to work - dissatisfied with herself.	A boisterous extrovert Very friendly and out-going Uninhibited and speaks freely, happy Enjoys life - charming and popular with the girls - has clever older brothers A highly-strung extrovert Happy and confident - motherly towards younger brother Very friendly and well-adjusted in all his relationships Very pleasant child A very pleasant child Nice Quiet and pleasant Quiet and industrious, he always does his best - great concertration and a sense of humour Slightly attention seeking Very demanding of attention Probably immature - lacks ambition - communicates poorly with adults Very timid and not really happy at school. Mother injured in car accident. Previously under psychiatric care - remains nervous and moody.

PRIMARY SCHOOL: INFANT'S - CHILD'S QUESTIONNAIRE

(Please underline which in each case)

1. Do you like school?
   Yes/No.

2. Which is nicest:
   In the classroom
   In the Hall
   Playtime.

3. How do you like working best:
   With a teacher giving a lesson to the whole class
   With four or five others at a table
   With one other boy or girl
   By yourself.

4. What do you like doing best:
   Reading
   Writing
   Painting
   Music & Movement
   Singing
   Maths.

5. Who do you like being with best:
   Other children
   Grown-up people.

6. Have you a special friend:
   Yes/No
   Is your friend a boy/girl
   How old is your friend ....

7. Is your friend:
   With you in school
   Lives near your home
   Is somewhere else.

8. What do you like doing at home best:
   Watching TV
   Reading
   Making something
   Writing
   Painting
   Doing Puzzles
   Music
   Listening to stories
   Swimming or outdoor games
   Going for walks
   Looking after pets.
   (anything else: (Please specify).

9. What is your name? ....

10. How old are you? .... years .... months

PRIMARY SCHOOL: JUNIOR CHILD'S QUESTIONNAIRE

Please tick the words which say what you feel.

1. Do you like school:

Very much
Quite a lot
Not much
Not at all
Hate it.

2. Tick what you like doing in school:

Being in the class-room
Being in the hall for music, singing, film, drama, etc.
Playtime
After school clubs in school (If so, which one ....)
If you like one best write it here ....

3. Tick where you would like to be in term-time:

At home
At school
Somewhere else

4. Tick the way you like working in school:
With a teacher giving a lesson to the whole class
With four or five others at a table
With one other boy or girl
By yourself.

(If you like one way especially, underline it as well)

5. Do you like working the ways you have ticked or underlined in 4. above.

All the time
Some of the time
A little of the time.

Tick your answer.

6. Tick what you like doing at school:

Cross out the things your school does not do.

Reading
Creative Writing
Painting and Drawing
Music and Singing
Music and Movement
Mathematics or Sums
Science
Pottery
Nature Study and the Environment

Project
Free Activity
Social Studies
Craft-work
French
Swimming
Outdoor Games
School T.V. Programmes

Write anythings you like doing specially ....

....

7. Are you working on a project? Tick which one you do. Yes...... No ....

If you are working on a project, tick to show whether you

Like it very much
Quite a lot
Not much
Not at all
Hate it.

cont'd....

JUNIOR CHILD'S QUESTIONNAIRE - Side 2.

8. Tick who you like being with best:

Other children
Your parents
Other grown-up people.

9. Tick if you have:

A special friend in your school class
A special friend who is not at your school
If you are one of a group of children who are friends
No special friends among children.

10. If you have a special friend, tick to show whether a boy ..... or girl .....

Tick if you frierd is older ..... or younger ..... than you are.

11. Tick those things you like doing at home. Underline those things you like doing best.

Watching T.V.
Reading
Writing stories or poetry
Drawing or painting
Doing puzzles
Mathematics or sums
Playing music
Dancing
Swimming
Outdoor games
Looking after pets
Making something
Just playing:

If so, what sort of playing do you like best ....

....

Anything else ....

12. Anything else you like doing at home:

....

....

13. Anything else you like doing at school:

....

....

14. Anything else you want to say:

....

....

Your name: .... Age: ....years .... months

Today's date ....

PRIMARY SCHOOL: PARENT'S QUESTIONNAIRE

(All information given will be treated as confidential)

One of the objectives of this questionnaire is to see to what extent the parents' views agree with those of their children so will you please give what you think is the correct answer without consulting your son or daughter. If you do not know the answer then this should be indicated.

Please tick or fill in where appropriate.

1. Child's name .... sex ....Years......Months......

2. How many terms has your child been at his present school? ....Terms

3. Was your child absent from school during the last three terms:

   Not at all
   Not more than one week
   Not more than a total of one month
   Up to one term's absence
   Between one and two term's absence .

4. Is your child the first born / second / third, etc. ....

5. Does your child have:

   Very good heatlh
   Good health
   Fair health
   Rather poor health
   Bad health

6. On the whole do you think your child likes school:

   Very much
   Fairly well
   Not much
   Not at all
   Hates it
   Don't know.

7. Please tick those parts of the school day you think he/she generally likes:

   Working in the classroom
   Being in the hall for music, singing, drama, film, etc.
   Playtime
   Sport and/or swimming
   After school clubs in school.

   If he/she likes one or more parts of the day best please name them:

   ....

8. Please tick each of the following you think your child usually likes doing in school. Cross out those things the school does not do.

   Reading
   Creative Writing (composition)
   Free Activity
   Project or topic
   Social Studies
   Maths or sums

   Pottery and craftwork
   Needlework
   Painting and drawing
   Music and singing
   Music and movement
   Outdoor games or sport

   Please name anything he likes doing best ....

   ....

cont'd.....

9. Please tick if you (or anyone else outside school) helps to teach your child.

Occasionally (about ½ hour per month)	Regularly (about one hour per week)
Reading	Reading
Handwriting	Handwriting
Writing stories or composition	Writing stories or composition
Spelling	Spelling
Maths	Maths

10. Do you help your child with his school work in any other way?

....

....

11. Is your child friends with:

One particular boy/girl at school
A particular boy/girl who does not go to the same school
A group of children at school
No particular child
Don't know

12. For most of the time who do you think your child prefers to be with:

Child of his/her own age
Children one year or more older
Children one year or more younger
Grown-ups
Don't know
Very variable

13. Does your child like doing any of the following. If so, please tick.

Watching T.V.
Reading
Making Something
Creative Writing
Drawing and Painting
Looking after Pets

Doing puzzles
Mathematical puzzles
Music
Dancing
Swimming or outdoor games, sport
Drama

Playing (in what way)

....

Anything else (please specify)

....

Name those things he likes doing best

....

14. Any further comments you may like to make:

....

Date ....

PRIMARY SCHOOL: TEACHER'S QUESTIONNAIRE

Please underline the view with which you agree.

BOY: GIRL: AGE: ......yrs. ...... mths. d.o.b.................

1. Is the above child:-

Above average age for the class.
About 6 months older.
About six months younger.
About one year younger.
More than one year younger (specify amount) ....

2. Is he/she

Taller than the average in the class. Actual height ....
About the same height.
Shorter than the average.

3. Is he/she

Heavier than the average in the class. Actual Weight ....
About the same weight.
Lighter than the average.

4. Is his/her standard of work

Average for the class.
Below the class average.
Above the class average.
At least one year in advance of the class average.

5. Does his/her performance vary widely with the subject matter. Yes/No.

6. At which is he/she best:

Writing
Music & Singing
Social Studies
Reading
Music & MOvement
Pottery
Arithmetic
Work on own project
Craft or Needlework
Painting
Science

7. At which is he/she poorest:

Writing
Music & Singing
Social Studies
Reading
Music & Movement
Pottery
Arithmetic
Work on own project
Craft or Needlework
Painting

8. Is he/she

Average at games and swimming
Poor at games and swimming
Very good at both.

9. Is he/she

Very attentive in class.
Average attentiveness.
Inattentive.
Disciplinary Problem.

10. Does he/she spend most time

Working with the whole class in one group
Working at a table with four or five
Working on his/her own.

Cont'd....

TEACHER'S QUESTIONNAIRE - Sheet 2.

11. Is his/her physical development and health

Very good
Good
Average
Poor
Very poor.

12. During the last twelve months has he/she been absent from school:

Not absent at all
Absent for a total of one week or less.
Absent for a total of up to one month.
Absent for a total of up to a term.

13. Is he/she

Very popular with the other children
Average popularity.
Not very popular.
An Isolate.

14. Does he/she have in his /her own class:

A group of friends.
One special friend (also high I.Q.)
No friends.

15. Does he/she have friends in a higher/lower class

A group of friends.
One special friend.
No friend.

Please add any special remarks below

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